



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### Usage guidelines

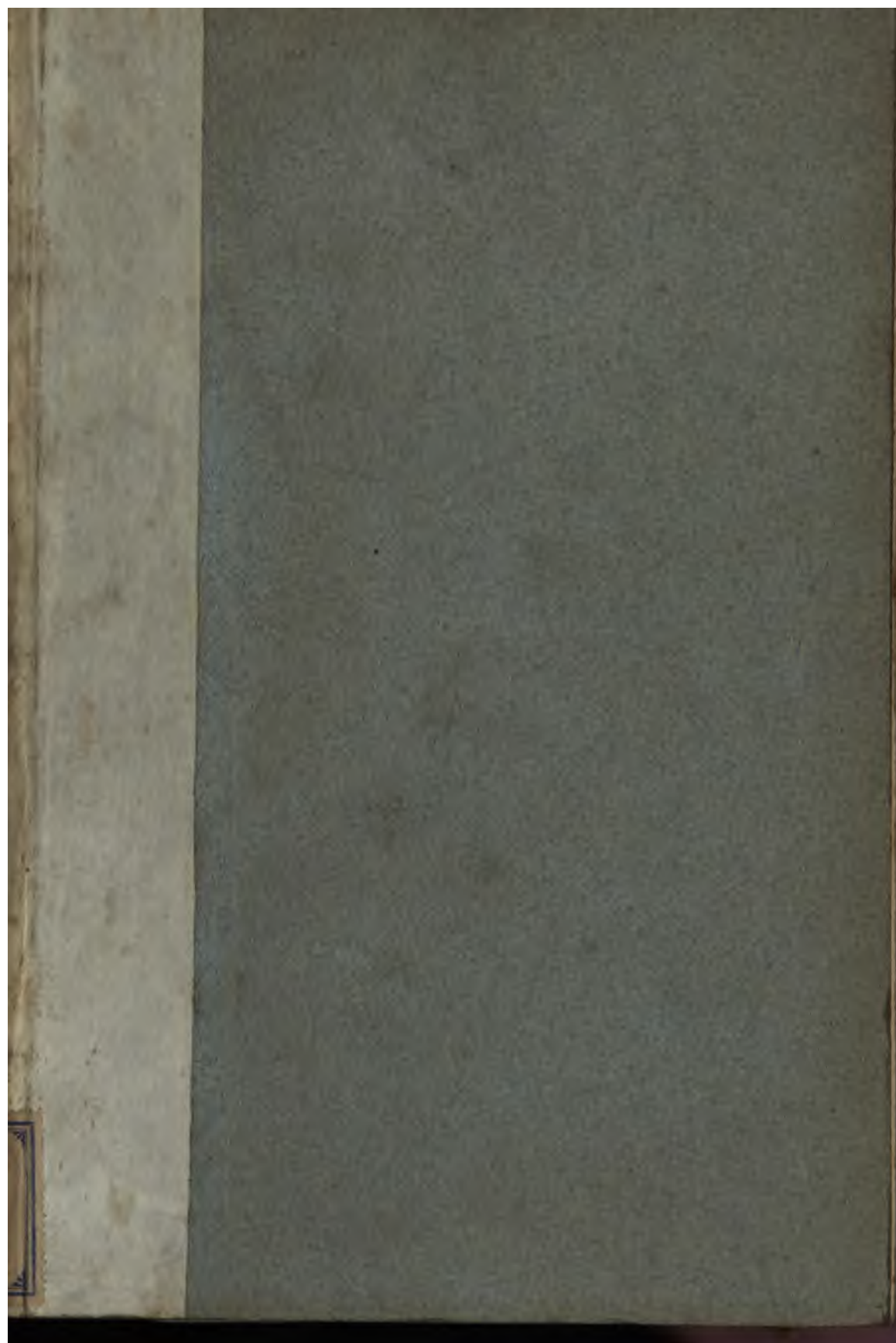
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

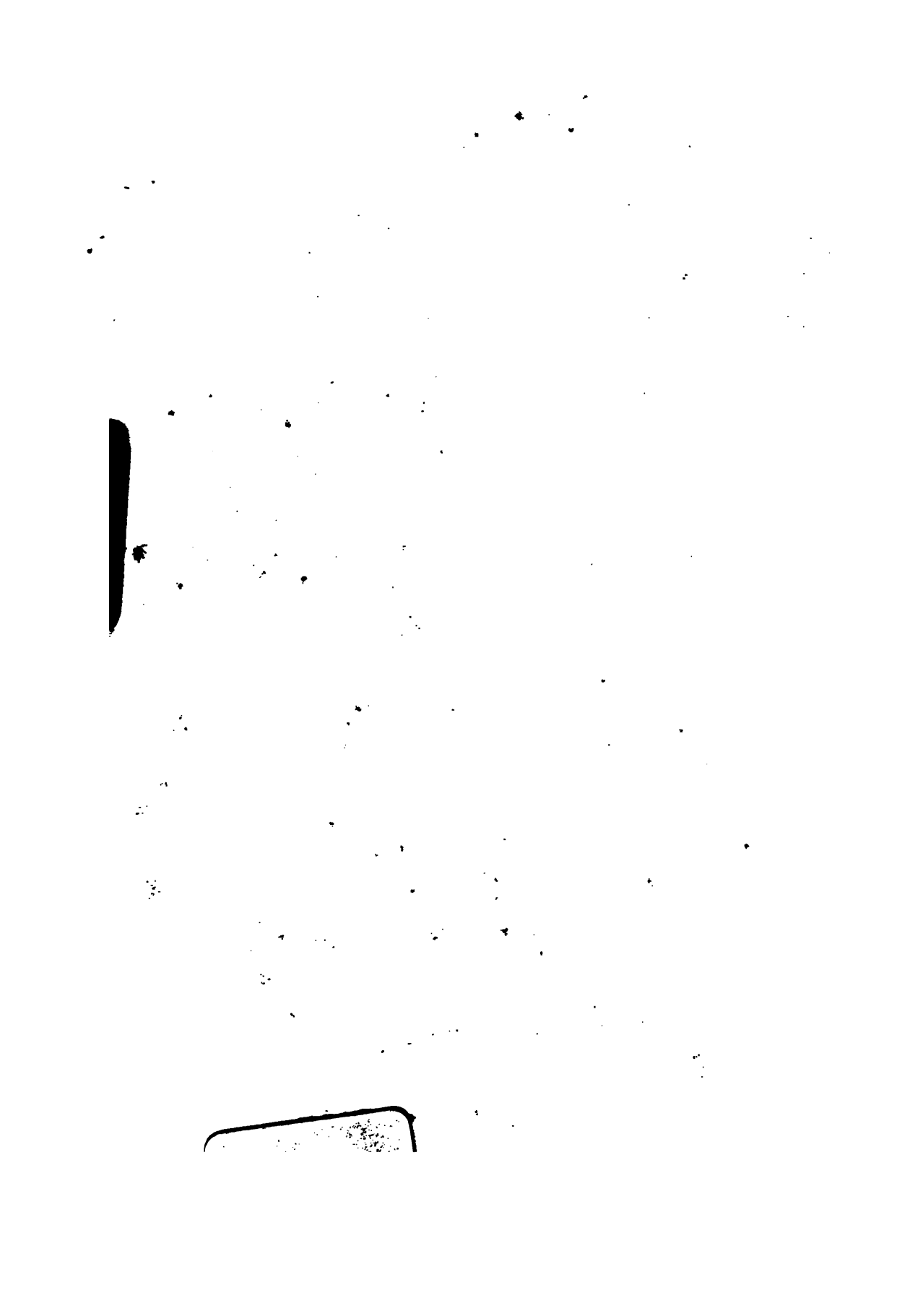
We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>







[illegible]



**C A T A L O G U E**  
OF THE  
**GOVERNMENT CENTRAL MUSEUM,**  
**M A D R A S.**

---

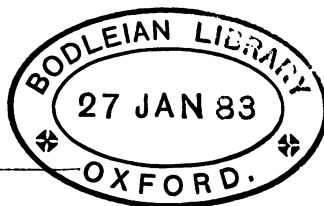
**ARRANGED AND COMPILED**  
BY  
EDWARD BALFOUR, Esq., SURGEON, MADRAS ARMY,  
OFFICER IN CHARGE.

---

**PHYSICAL AND CHEMICAL CHARACTERS**  
OF  
**MINERALS.**

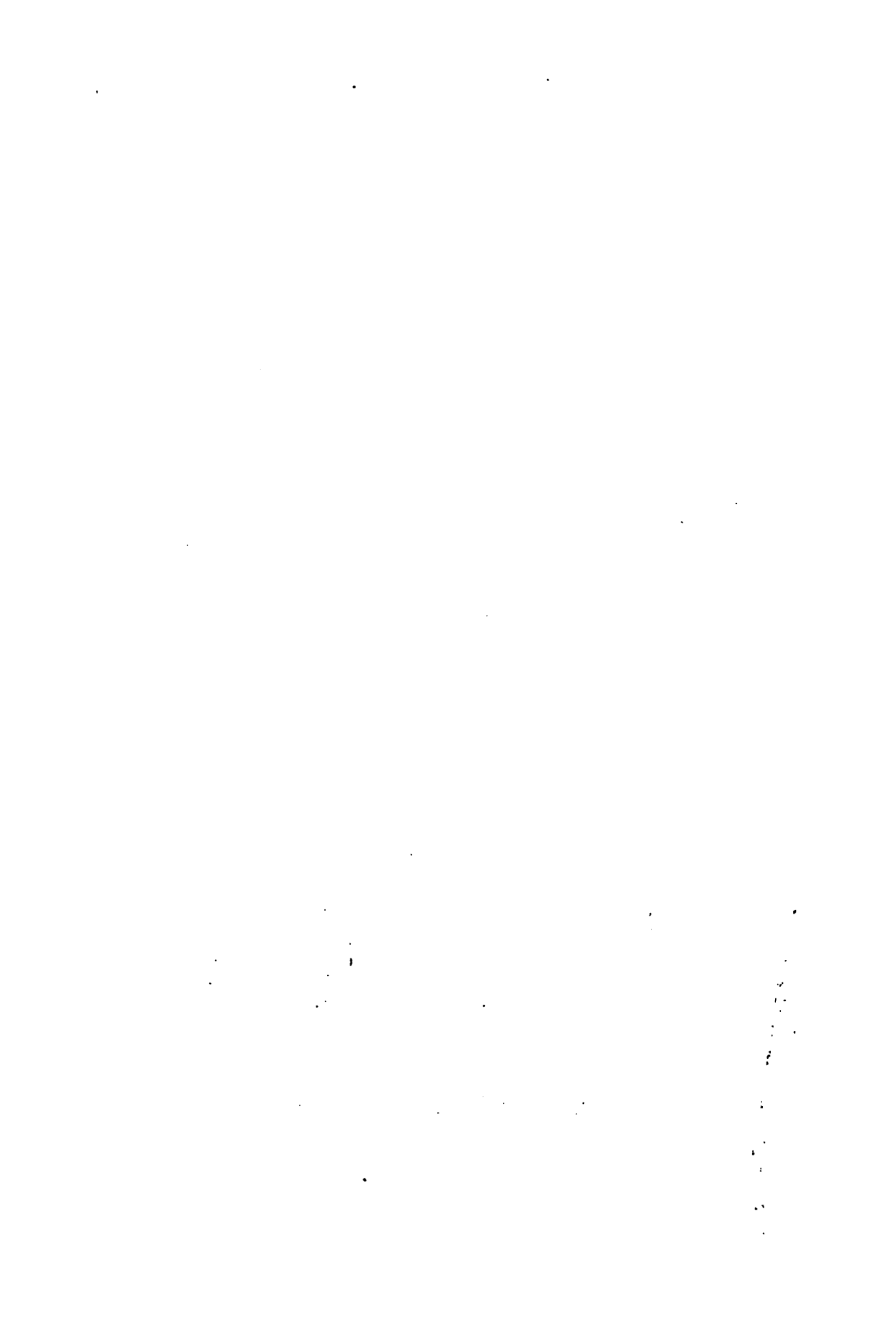
---

BY ORDER OF THE GOVERNMENT  
OF  
M A D R A S.



**MADRAS:**  
Printed at the Military Male Orphan Asylum Press, Mount Road.  
1855.

1855. e 1139





## **C O N T E N T S.**

---

PHYSICAL CHARACTERS OF MINERALS.....	1
STRUCTURE AND IMITATIVE SHAPES.....	3
PSEUDOMORPHISM.....	7
TWIN CRYSTALS.....	9
AGGREGATION.....	11
FRACTURE.....	12
CLEAVAGE.....	17
HARDNESS.....	19
LUSTRE.....	21
COLOUR.....	23
DIAPHANEITY.....	33
REFRACTION.....	34
PHOSPHORESCENCE.....	35
TASTE.....	37
ODOUR.....	37
ELECTRICITY.....	39
MAGNETISM.....	42
CHEMICAL CHARACTERS OF MINERALS.....	45

---

1. The first part of the document is a title page. It contains the title of the document, the author's name, and the date of the document.

2. The second part of the document is an introduction. It contains a brief overview of the document's content and the author's purpose in writing the document.

3. The third part of the document is the main body. It contains the main content of the document, which is organized into several sections.

4. The fourth part of the document is a conclusion. It contains a summary of the main points of the document and the author's final thoughts.

5. The fifth part of the document is a bibliography. It contains a list of the sources that the author used in writing the document.

6. The sixth part of the document is an appendix. It contains additional information that is related to the main content of the document.

7. The seventh part of the document is a glossary. It contains a list of the terms and definitions used in the document.

8. The eighth part of the document is an index. It contains a list of the topics and subtopics covered in the document.

9. The ninth part of the document is a list of figures and tables. It contains a list of the figures and tables included in the document.

10. The tenth part of the document is a list of references. It contains a list of the references cited in the document.

# INDEX.

NAMES OF MINERALS.	<i>In illustration of</i>	No.	NAMES OF MINERALS.	<i>In illustration of</i>	No.
<b>A.</b>					
Actinolite, glassy.....	Lustre and Color..	70	Augite.....	Twin Crystals .....	1
Actinolite, glassy.....	Scale of Fusibility..	5	Augite, Prismaticoid..	Lustre and Color..	72
Actinolite, glassy.....	Scale of Hardness..	4	Augite, Prismaticoid..	Lustre and Color...	118
Agate.....	Structure and Imitative Shapes. . .	18	Avanturine, Felspathic..	Lustre and Color...	115
Agalmatolite.....	Aggregation & Fracture.....	26	Axstone, figure stone. . .	Aggregation & Fracture.....	12
Alunogene.....	Taste and Odour..	5	<b>B.</b>		
Allophane.....	Refraction, Diaphaneity and Phosphorescence....	23	Barytes, Carbonate of..	Electricity & Magnetism .....	9
Amethyst.....	Lustre and Color..	56	Barytes ; Heavy spar..	Electricity & Magnetism.....	10
Amphibole.....	Lustre and Color..	50	Barytes ; Heavy spar..	Cleavage .....	10
Amphibole.....	Lustre and Color..	51	Basalt.....	Aggregation & Fracture.....	15
Amphibole fibreux.....	Refraction, Diaphaneity and Phosphorescence....	27	Basalt.....	Lustre and Color..	48
Amphibole, common...	Cleavage.....	19	Beryl, common .....	Cleavage.....	11
Andalusite, prismatic..	Pseudomorphism..	15	Beryl, Noble.....	Lustre and Color ..	66
Anhydrite.....	Electricity & Magnetism .....	3	Beryl, Noble.....	Refraction, Diaphaneity and Phosphorescence....	12
Anhydrite.....	Aggregation & Fracture.....	57	Bismuth, Octohedral ...	Refraction, Diaphaneity and Phosphorescence....	20
Anhydrite.....	Lustre and Color...	60	Bitumen .....	Aggregation & Fracture.....	36
Antimony Ore, gray....	Lustre and Color..	1	Bitumen, Elastic.....	Aggregation & Fracture.....	32
Antimony Ore, gray....	Scale of Fusibility..	2	Bitumen, Solid.....	Taste and Odour..	8
Antimony Blende Prismatic.....	Lustre and Color..	101	Blende, Prismatic Rhomboidal Rubi.....	Lustre and Color..	92
Anthraconite.....	Taste and Odour..	14	Bronzeite.....	Lustre and Color...	15
Apatite, Rhombohedral..	Scale of Hardness..	9	Brown Coal.....	Lustre and Color..	52
Apatite, conchoidal....	Lustre and Color..	73	Brown Coal.....	Lustre and Color...	111
Arsenical Pyrites, prismatic.....	Taste and Odour..	18	<b>C.</b>		
Arsenical Pyrites, axotomous.....	Lustre and Color..	30	Calcedony, common....	Aggregation & Fracture.....	61
Arsenic, Native.....	Refraction, Diaphaneity and Phosphorescence....	21	Calcedony, common....	Lustre and Color...	22
Arragonite.....	Electricity & Magnetism.....	5	Calcedony, common....	Lustre and Color...	41
Arragonite.....	Structure and Imitative Shapes. . .	26	Calcedony, common....	Lustre and Color..	59
Arragonite.....	Lustre and Color..	36	Calamine.....	Electricity & Magnetism.....	38
Arragonite.....	Lustre and Color..	116	Calamine.....	Electricity & Magnetism...	13
Arragonite.....	Refraction, Diaphaneity and Phosphorescence....	10	Calcite: Calcareous spar	Lustre and Color...	6
Asbestos, common....	Structure and Imitative Shapes. . .	7	Calcite: Calcareous spar	Scale of Hardness..	2
Asbestos, common....	Aggregation & Fracture.....	13	Calcite: Calcareous spar	Refraction, Diaphaneity and Phosphorescence.....	4
Asphalte.....	Aggregation & Fracture.....	45	Celestine.....	Electricity & Magnetism.....	11
Augite.....	Electricity & Magnetism .....	22	Celestine.....	Lustre and Color..	20
			Celestine.....	Cleavage.....	14
			Gerolite.....	Aggregation & Fracture.....	44

NAMES OF MINERALS.	<i>In illustration of</i>	No.	NAMES OF MINERALS.	<i>In illustration of</i>	No.
Chalk, Black.....	Aggregation & Frac- ture.....	30	<b>D.</b>		
Chromic iron.....	Electricity & Mag- netism.....	44	Diopside.....	Refraction, Diapha- neity and Phos- phorescence....	16
Chrysoprase.....	Lustre and Color..	69	Diamond, Octohedral...	Scale of Hardness.	10
Chrysolite.....	Lustre and Color..	75	<b>E.</b>		
Chlorophyllite.....	Pseudomorphism..	6	Egerane.....	Electricity & Mag- netism.....	27
Clay.....	Taste and Odour...	10	Ehrenbergit.....	Aggregation & Frac- ture.....	28
Clay mixed with red oxide of Iron: Rothel.	Aggregation & Frac- ture.....	29	Electroscope, a delicate.		
Clay Slate, Devonian..	Aggregation & Frac- ture.....	70	Epidote.....	Electricity & Mag- netism.....	23
Cleavelandite.....	Aggregation & Frac- ture.....	4	Epsom Salt.....	Taste and Odour...	7
Cleavelandite.....	Aggregation & Frac- ture.....	5	Erdwachs.....	Aggregation & Frac- ture.....	37
Cleavelandite.....	Aggregation & Frac- ture.....	6	<b>F.</b>		
Cleavelandite.....	Twin Crystals....	11	Felspar.....	Pseudomorphism..	1
Coal, Foliated.....	Lustre and Color..	4	Felspar, Compact..	Aggregation & Frac- ture.....	59
Coal, Foliated.....	Refraction, Diapha- neity and Phos- phorescence....	24	Felspar, Labrador.....	Lustre and Color..	113
Cobalt Pyrites, Hexahe- dral.....	Lustre and Color...	32	Felspar, Prismatic.....	Electricity & Mag- netism.....	20
Cobalt, Tin white....	Structure and Imita- tive Shapes....	8	Felspar, Prismatic..	Structure and Imita- tive Shapes....	38
Cobalt, Tin white....	Structure and Imita- tive Shapes....	37	Felspar, Prismatic....	Twin Crystals....	8
Cobalt, Oxide of.....	Lustre and Color...	54	Felspar, Prismatic....	Twin Crystals....	12
Cobalt Ochre, Red....	Lustre and Color..	99	Felspar, Prismatic....	Cleavage.....	5
Coccolite.....	Lustre and Color..	74	Felspar, Prismatic....	Scale of Fusibility.	1
Copper, Blue.....	Lustre and Color..	55	Felspar, Prismatic....	Refraction, Diapha- neity and Phos- phorescence....	15
Copper, Blue.....	Lustre and Color..	63	Felspar, Prismatic....	Scale of Hardness..	3
Copper, Indigo.....	Lustre and Color..	62	Felspar, Prismatic....	Twin Crystals....	9
Copper, Octohedral....	Structure and Imita- tive Shapes....	28	Fer oxyde hydrate jaune	Lustre and Color...	94
Copper, Octohedral....	Aggregation & Frac- ture.....	10	Fibrolite.....	Aggregation & Frac- ture.....	14
Copper, Octohedral....	Lustre and Color..	26	Fluor-spar.....	Electricity & Mag- netism.....	4
Copper, Pyrites.....	Cleavage.....	28	Fluor-spar.....	Aggregation & Frac- ture.....	3
Copper, Variegated....	Refraction, Diapha- neity and Phos- phorescence....	22	Fluor-spar.....	Lustre and Color..	39
Copper, Vitreous.....	Aggregation & Frac- ture.....	39	Fluor-spar.....	Cleavage.....	1
Copper, Silico-Carbo- nate of, on Heavy Spar	Lustre and Color..	64	Fluor-spar.....	Scale of Hardness..	6
Cordierite.....	Electricity & Mag- netism.....	25	Fluor-spar.....	Refraction, Diapha- neity and Phos- phorescence....	14
Gordierite.....	Lustre and Color...	119	Fluor-spar.....	Refraction, Diapha- neity and Phos- phorescence....	28
Corundum, Rhomboidal	Scale of Hardness.	7	Flint.....	Aggregation & Frac- ture.....	64
Corundum, dodecahedral	Lustre and Color..	95	Flint.....	Lustre and Color..	43
Criolite.....	Cleavage.....	6			

NAMES OF MINERALS.	<i>In illustration of</i>	No.	NAMES OF MINERALS.	<i>In illustration of</i>	No.
Flint.....	Lustre and Color...	45	Gypsum, fibrous .....	Lustre and Color..	16
Flint.....	Refraction, Diaphaneity and Phosphorescence....	8	Gypsum, in the form of rock salt.....	Pseudomorphism..	3
Foliated Zeolite....	Lustre and Color..	91	<b>II.</b>		
Franklinite.....	Electricity & Magnetism.....	48	Heavy-spar, compact...	Structure and Imitative Shapes....	17
Fuller's Earth.....	Aggregation & Fracture.....	27	Heavy-spar, lamellar...	Structure and Imitative Shapes....	13
<b>G.</b>			Heliotrope.....	Aggregation & Fracture.....	48
Galena.....	Structure and Imitative Shapes....	40	Heliotrope .....	Lustre and Color..	23
Galena.....	Aggregation & Fracture.....	49	Hematite, fibrous brown	Structure and Imitative Shapes....	25
Galena.....	Cleavage.....	12	Hematite.....	Pseudomorphism..	12
Galena.....	Aggregation & Fracture.....	40	Honey-stone.....	Structure and Imitative Shapes....	32
Galena.....	Lustre and Color...	34	Honey-stone .....	Lustre and Color..	82
Garnet.....	Lustre and Color..	93	Hornblende, Basaltic...	Electricity & Magnetism... ..	21
Garnet, Precious; Iron	Electricity & Magnetism... ..	28	Hornblende, Basaltic..	Structure and Imitative Shapes....	39
Garnet.....			Hornstone.....	Aggregation & Fracture.....	17
Garnet, Precious; Iron	Lustre and Color...	100	Hornstone.....	Aggregation & Fracture.....	60
Garnet, Precious; Iron	Scale of Fusibility.	4	Hornstone.....	Lustre and Color..	107
Garnet.....	Aggregation & Fracture.....	56	Hornstone... ..	Aggregation & Fracture.....	63
Gesso.....	Refraction, Diaphaneity and Phosphorescence....	6	Hornstone in the form of Calcite .....	Pseudomorphism..	10
Gilbertite.....	Lustre and Color..	13	Hyacinth.....	Lustre and Color..	90
Gold, Hexahedral....	Lustre and Color..	31	<b>I.</b>		
Graphite, Rhomboidal.	Aggregation & Fracture.....	25	Ichthyophthalmie....	Cleavage.....	20
Granite, Graphie....	Aggregation & Fracture.....	7	Iron, Carbonate of: Chalybite. ....	Lustre and Color..	21
Green-earth.....	Pseudomorphism..	18	Iron, Earthy blue. ....	Aggregation & Fracture.....	61
Green-earth.....	Lustre and Color..	65	Iron Glance.....	Lustre and Color..	18
Gypsum.....	Electricity & Magnetism.. ..	2	Iron Glance.....	Electricity & Magnetism.. ..	50
Gypsum.....	Twin Crystals .....	3	Iron Glance.....	Refraction, Diaphaneity and Phosphorescence....	17
Gypsum.....	Scale of Hardness.	12	Iron Glance.....	Refraction, Diaphaneity and Phosphorescence....	18
Gypsum.....	Aggregation & Fracture.....	33	Iron, Magnetic.....	Electricity & Magnetism... ..	43
Gypsum, Axifrangible..	Aggregation & Fracture.....	43	Iron, Magnetic.....	Twin Crystals... ..	10
Gypsum, Axifrangible..	Cleavage.....	18	Iron Ochre.....	Lustre and Color..	85
Gypsum, Axifrangible..	Refraction, Diaphaneity and Phosphorescence....	1	Iron Ore, Magnetic....	Electricity & Magnetism.. ..	40
Gypsum :Prismatic cube spar.....	Cleavage.....	7			
Gypsum, fibrous .....	Structure and Imitative Shapes....	6			

NAMES OF MINERALS.	<i>In illustration of</i>	No.	NAMES OF MINERALS.	<i>In illustration of</i>	No.
Iron Ore, Magnetic....	Electricity & Magnetism.....	41	Kyanite, Prismatic....	Aggregation & Fracture.....	9
Iron Pyrites.....	Lustre and Color..	2	Kyanite, Prismatic....	Lustre and Color...	58
Iron Pyrites.....	Pseudomorphism..	14	<b>L.</b>		
Iron Pyrites, Hexahedral..	Aggregation & Fracture.....	55	Lead, Carbonate of....	Twin Crystals....	4
Iron Pyrites, Hexahedral.....	Pseudomorphism..	16	Lead, Carbonate of....	Electricity & Magnetism.....	12
Iron Pyrites, Hexahedral.....	Refraction, Diaphaneity and Phosphorescence...	19	Lead, Chromate of....	Structure and Imitative Shapes..	36
Ironstone, Clay... ..	Structure and Imitative Shapes..	22	Lead, Chromate of....	Lustre and Color..	89
Ironstone, Clay....	Structure and Imitative Shapes..	23	Lead, Green Phosphate of	Lustre and Color...	71
Iron Ore, Red.....	Structure and Imitative Shapes..	2	Lead-spar, Pyramidal...	Lustre and Color..	88
Iron Ore, Red : Hematite	Structure and Imitative Shapes..	5	Lead, Seleniuret of...	Taste and Odour...	20
Iron Ore, Red.....	Structure and Imitative Shapes....	20	Lepidocrocite....	Structure and Imitative Shapes....	16
Iron Ore, Rhomboidal..	Electricity & Magnetism.....	42	Leptynite.....	Aggregation & Fracture.....	50
Iron Ore, Titaniferous, in Basalt.....	Electricity & Magnetism.....	45	Levy.....	Twin Crystals....	6
Iron Ore, Titaniferous..	Electricity & Magnetism.....	46	Lieberit in Porphyry	Pseudomorphism..	4
Iron, Tungstate of....	Structure and Imitative Shapes..	15	Lime, Carbonate of....	Electricity & Magnetism.....	6
Iron, Tungstate of....	Lustre and Color..	3	Lime, Carbonate of....	Structure and Imitative Shapes..	1
Iron, Tungstate of....	Cleavage.....	2	Lime, Carbonate of....	Structure and Imitative Shapes..	11
Iserine.....	Electricity & Magnetism.....	47	Lime, Carbonate of....	Aggregation & Fracture.....	1
<b>J.</b>			Lime, Carbonate of....	Aggregation & Fracture.....	2
Jasper.....	Aggregation & Fracture.....	65	Lime, Carbonate of, in the form of Felspar...	Pseudomorphism..	19
Jasper.....	Lustre and Color..	106	Lime, Carbonate of, in the form of Gray Liasite.....	Pseudomorphism..	2
Jasper, Porcelain... ..	Aggregation & Fracture.....	54	Lime, Carbonate of....	Cleavage.....	15
Jasper, Ribbon.....	Aggregation & Fracture.....	46	Limestone, Granular...	Structure and Imitative Shapes..	12
Jasper, Striped.....	Lustre and Color..	25	Limestone, Granular...	Lustre and Color..	38
<b>K.</b>			Limestone, Pisiforme...	Structure and Imitative Shapes..	21
Kiesel Thon : Eisen-oxyd : Manganoxyd.	Structure and Imitative Shapes....	34	Limestone, Phosphate of.	Refraction, Diaphaneity and Phosphorescence....	29
Kyanite, Prismatic....	Electricity & Magnetism.....	15	Lithomarge, Ferruginous	Lustre and Color...	57
			Lithomarge.....	Aggregation & Fracture.....	69
			<b>M.</b>		
			Magnesia, Borate of..	Electricity & Magnetism.....	36
			Magnetoscope, a delicate.....		
			Magnesite.....	Aggregation & Fracture.....	68

# I N D E X.

v

NAMES OF MINERALS.	In illustration of	No.	NAMES OF MINERALS.	In illustration of	No.
Malachite, Fibrous....	Lustre and Color..	68	<b>O.</b>		
Malachite, Pseudomorphous, resembles Red Copper.....	Pseudomorphism..	7	Obsidian.....	Aggregation & Fracture..	67
Manganese, Gray Oxid. of.....	Cleavage.....	4	Obsidian.....	Lustre and Color...	49
Manganese, Gray Oxid. of.....	Structure and Imitative Shapes. .	3	Opal, common ...	Lustre and Color...	40
Manganese, Black....	Structure and Imitative Shapes. .	24	Opal, common... ..	Lustre and Color..	114
Marble, Lucullan....	Taste and Odour..	15	Opal, Precious... ..	Lustre and Color..	112
Marble, Anthraconitic...	Taste and Odour..	14	Ozokerite.....	Taste and Odour...	19
Margarit.....	Lustre and Color..	12	<b>P.</b>		
Meerschaum.....	Aggregation & Fracture.....	16	Pitchstone.....	Lustre and Color..	8
Menelite; Quartz resinite	Structure and Imitative Shapes. .	19	Pitchstone.....	Lustre and Color..	76
Mica.....	Electricity & Magnetism.....	14	Picrosmine.....	Taste and Odour...	13
Mica.....	Aggregation & Fracture.....	31	Pierre grasse.....	Electricity & Magnetism.....	19
Mica.....	Lustre and Color..	53	Plasma.....	Lustre and Color..	24
Mica.....	Cleavage.....	17	Platina, Native... ..	Lustre and Color...	35
Mica.....	Taste and Odour..	12	Porcelain earth.....	Aggregation & Fracture..	20
Mica, Iron.....	Scale of Hardness.	11	Prismatic Zeolite.....	Twin Crystals....	5
Mica, Lithia.....	Structure and Imitative Shapes. .	14	Prase.. ..	Lustre and Color..	67
Miemite.....	Lustre and Color..	98	Predazit (Petzholdt) ..	Refraction, Diaphaneity and Phosphorescence ..	30
Mine de Plomb arenacé	Electricity & Magnetism.....	7	Pumice, Glassy . . . .	Structure and Imitative Shapes. .	30
Mineral Oil, black....	Structure and Imitative Shapes....	35	Pyrites.....	Taste and Odour..	17
Mineral Oil, yellow....	Aggregation & Fracture.....	21	Pyrites, Magnetic.....	Electricity & Magnetism.....	49
Mineral Pitch, schlaggy.	Aggregation & Fracture.....	22	Pyrites, Magnetic.....	Lustre and Color..	27
Mineral Resin, yellow..	Electricity & Magnetism.....	30	Pyrites, Radiated.....	Structure and Imitative Shapes. .	39
Molybdene, Sulphurate of.....	Electricity & Magnetism.....	31	<b>Q.</b>		
Muscovite.....	Lustre and Color..	33	Quartz, common.....	Structure and Imitative Shapes. .	4
Myelin.....	Structure and Imitative Shapes. .	10	Quartz, common.....	Aggregation & Fracture..	51
Myelin.....	Aggregation & Fracture.....	24	Quartz, common.....	Aggregation & Fracture..	62
<b>N.</b>			Quartz, common.....	Lustre and Color..	42
Native Leadstone.....	Lustre and Color..	87	Quartz, common.....	Refraction, Diaphaneity and Phosphorescence ..	3
Nephrite.....	Electricity & Magnetism.....	39	Quartz, common.....	Refraction, Diaphaneity and Phosphorescence ..	25
Nephrite.....	Aggregation & Fracture.....	11	Quartz, common, Quartz Freshwater.....	Aggregation & Fracture.....	52
Nontronit.....	Aggregation & Fracture.....	36	Quartz in the form of fluor-spar.....	Pseudomorphism..	9
			Quartz in the form of Baryta.....	Pseudomorphism..	31

NAMES OF MINERALS.	In illustration of	No.	NAMES OF MINERALS.	In illustration of	No.
Quartz in the form of Anhydrite.....	Pseudomorphism..	17	Senormonts apparatus & Crystals.....	To illustrate the thermotic characters of Minerals.	
Quartz covered with crystals of Heavy-Spar	Pseudomorphism..	20			
Quartz, Smoky. ....	Lustre and Color..	104			
Quartz, Ferruginous..	Lustre and Color..	102	Serpentine in the form of felspar.....	Pseudomorphism..	8
Quartz, Ferruginous..	Lustre and Color..	103	Serpentine, Common..	Aggregation & Fracture.....	47
Quartz, Rose.....	Lustre and Color..	96	Serpentine, Common..	Aggregation & Fracture.....	58
Quartz, Rose.....	Refraction, Diaphaneity and Phosphorescence..	5	Serpentine, Common..	Lustre and Color..	117
<b>R.</b>			Silver Glance, Hexahedral.....	Aggregation & Fracture.....	34
Rock Crystal.....	Electricity & Magnetism.....	26	Silver, Hexahedral....	Aggregation & Fracture.....	42
Rock Crystal.....	Lustre and Color..	19	Silver, Hexahedral....	Lustre and Color..	29
Rock Crystal.....	Scale of Hardness..	1	Silver Horn Ore.....	Aggregation & Fracture.....	35
Rock Crystal.....	Lustre and Color..	5			
Rock Crystal.....	Refraction, Diaphaneity and Phosphorescence..	2	Soap, Mountain.....	Lustre and Color..	46
Rock Crystal.....	Refraction, Diaphaneity and Phosphorescence..	11	Soda, Carbonate of....	Taste and Odour..	1
Rock Wood.....	Lustre and Color..	109	Spar, double refracting..	Electricity & Magnetism.....	33
Rock Salt.....	Taste and Odour..	3	Spar, double refracting..	Refraction, Diaphaneity and Phosphorescence..	9
<b>S.</b>			Spinel, blue.....	Electricity & Magnetism.....	24
Sal Ammoniac.....	Taste and Odour..	2	Spinel.....	Pseudomorphism..	5
Salt, Hexahedral Rock.	Electricity & Magnetism.....	1	Sphene.....	Twin Crystals....	2
Salt, Hexahedral Rock.	Cleavage.....	9	Stalactite.....	Lustre and Color..	37
Saltpetre : Natron.....	Taste and Odour..	4	Steatite : Soapstone....	Aggregation & Fracture.....	41
Sandstone in the form of Rock salt.....	Pseudomorphism..	11	Stilbite.....	Electricity & Magnetism.....	16
Scapolite.....	Cleavage.....	8	Stilbite.....	Lustre and Color..	11
Schiller-spar, Hemiprismatic.....	Lustre and Color..	108	Strontian, Carbonate of.	Electricity & Magnetism.....	8
Schiller-spar, Hemiprismatic.....	Scale of Fusibility..	3	Sulphate of Barytes ; Hepatite.....	Taste and Odour..	16
Schiller-spar, common..	Lustre and Color..	14	Sulphur, Prismatic..	Electricity & Magnetism.....	29
Schorlite.....	Lustre and Color..	79	Sulphur, Prismatic....	Aggregation & Fracture.....	19
Semi-Opal.....	Aggregation & Fracture.....	18	Sulphur, Prismatic....	Lustre and Color..	78
Semi-Opal.....	Aggregation & Fracture.....	66	Sulphur, Prismatic....	Taste and Odour..	9
Semi-Opal.....	Lustre and Color..	9	Sulphur, Prismatic....	Lustre and Color..	83
Semi-Opal.....	Lustre and Color..	10			
Semi-Opal.....	Lustre and Color..	81	<b>T.</b>		
Semi Opal.....	Lustre and Color..	110	Talc Mica, Prismatic..	Scale of Hardness..	5
Semi Opal.....	Refraction, Diaphaneity and Phosphorescence..	7	Tin stone.....	Twin Crystals....	7
			Titanium Ore, Prismatic pyramidal.....	Aggregation & Fracture.....	8



NAMES OF MINERALS.	In illustration of	No.	NAMES OF MINERALS.	In illustration of	No.
<b>V.</b>					
Titanium Ore, Prismatic pyramidal.....	Cleavage.....	3	Vesuvian .....	Lustre and Color..	7
Toadstone.....	Structure and Imitative Shapes. . .	32	Vitriol, Rhomboidal.....	Taste and Odour..	6
Toadstone.....	Structure and Imitative Shapes. . .	33	<b>W.</b>		
Topas, Prismatic.....	Electricity & Magnetism.....	37	Wavellite.....	Structure and Imitative Shapes. . .	9
Topas, Prismatic.....	Scale of Hardness.	8	Whetstone.....	Lustre and Color..	44
Topas, Prismatic.....	Refraction, Diaphaneity and Phosphorescence. . .	13	<b>Z.</b>		
Topas, Prismatic.....	Lustre and Color..	86	Zeolite, Axifrangible..	Electricity & Magnetism. . . . .	17
Tourmaline.....	Electricity & Magnetism. . . . .	35	Zeolite, Hexahedral. .	Electricity & Magnetism. . . . .	18
Tourmaline.....	Lustre and Color..	120	Zeolite, Needle.....	Lustre and Color..	97
Tourmaline, Rhomboidal	Electricity & Magnetism. . . . .	34	Zeolite, Needle....	Scale of Fusibility.	6
Trachyte.....	Aggregation & Fracture .....	53	Zeolite, Needle.....	Structure and Imitative Shapes. . .	27
Trachyte.....	Taste and Odour..	11	Zrinite, Needle.....	Structure and Imitative Shapes. . .	31
Triphane.....	Cleavage. . . . .	16	Zinc, Sulphuret of. ....	Lustre and Color..	17
Tripoli. . . . .	Aggregation & Fracture .....	23	Zinc, Sulphuret of. ....	Lustre and Color..	80
<b>U.</b>			Zinc, Sulphuret of. ....	Cleavage.....	13
Uran Glimmer.....	Lustre and Color..	77	Zinc, Sulphuret of. ....	Refraction, Diaphaneity and Phosphorescence . . .	26
Uran Ochre.....	Lustre and Color..	84	Zoisite .....	Lustre and Color..	47



# MINERALOGY.

## **A.** PHYSICAL CHARACTERS OF MINERALS.



# MINERALS

## TO ILLUSTRATE STRUCTURE AND IMITATIVE SHAPES.

**(Columnar, texture.)**

- No. 1. CARBONATE OF LIME. (*Phill*).  
KALKSPATH. CALCIT. (*Haid*).  
CHAUX CARBONATE. (*Häuy*).  
*from Töplitz, Bohemia.*

**(Columnar, texture.)**

- No. 2. RED IRON ORE.  
ROTHKEISENSTEIN.  
FER OLIGISTE: *Hæmatite*.  
*from Tilkerode in the Hartz.*

**(Divergent-Columnar, Radiated.)**

- No. 3. GRAY OXIDE OF MANGANESE.  
MANGANIT. (*Haid*). GRAU-  
BRAUNSTEIN (*Hausm*).  
ACERDESE. (*Beud*).  
*from Ihlefeld in the Hartz.*

**(Concentric Columnar.)**

- No. 4. COMMON QUARTZ.  
GEMEINER QUARZ.  
*from the Fragrathal, Tyrol.*

**(In long fibres.)**

- No. 5. RED IRON ORE, HAEMATITE.  
ROTKEISENSTEIN.  
FER OLIGISTE.  
*from Frýang, Bohemia.*

**(Fibrous.)**

- No. 6. FIBROUS GYPSUM.  
FASRIGER GYPS.  
CHAUX SULFATEE FIBREUSE.  
*from Rüdersdorf near Berlin.*

**(In very thin fibres.)**

- No. 7. COMMON ASBESTUS.  
ASBEST. (*Werner*).  
ASBEST DÜR.  
*from Greiner in the Tyrol.*

**(Reticulated, or net-like.)**

- No. 8. TIN WHITE COBALT. (*Phillips*).  
SPREISKOBALT (*Werner*). SMAL-  
TIN (*Haid*).  
COBALT ARSENICAL. (*Häuy*).  
*from Schneeberg in Saxony.*

**(Stellated, or star-like.)**

- No. 9. WAVELLITE. (*Jameson*).  
WEAVELIT. (*Werner*).  
ALUMINEPHOSPHATE. (*Häuy*).  
*from Zbirow near Beraun, Bohemia.*

**(Lamellar.)**

- No. 10. MICA.  
MUSCOVITE. (*Dana*).  
ZWEIFAXIGER GLIMMER.  
*from Tennville in Transylvania.*

**(Coarse grained.)**

- No. 11. CARBONATE of LIME. (*Phill*).  
KALKSPATH. CALCIT. (*Haid*).  
CHAUX CARBONATEE. (*Haüy*).  
*from Targas Finland.*

**(Granular.)**

- No. 12. GRANULAR LIMESTONE.  
KORNIGER KALK.  
CALCAIRE SACCHAROIDE.  
*from Carrara.*

**(Curved Conchoidal, with radiated texture.)**

- No. 13. LAMELLAR HEAVY-SPAR. (*Jameson*).  
KRUMMSCHALIGER SCHWERS-  
SPATH. (*Werner*).  
BARYTE SULFATEE CRISTAL-  
LISEE. (*Hy*).  
*from Freiberg.*

**(Curved Conchoidal.)**

- No. 14. IRON MICA.  
EISENGLIMMER.  
FER OLIGISTE ECAILLEUX.  
*from Sala, Sweden.*

**(Crystalline, Conchoidal.)**

- No. 15. TUNGSTATE of IRON. (*Philips*).  
WOLFRAM. (*Werner*).  
SCHEELIN FERRUGINEUX.  
(*Haüy*).  
*from Zinnwald in Bohemia.*

**(Scaly.)**

- No. 16. LEPIDOCROKIT. (*Ullmann*).  
*from Herdorf near Siegen.*

**(Compact.)**

- No. 17. COMPACT HEAVY-SPAR. (*Jameson*).  
DICHTER SCHWERSPATH. (*Werner*).  
BARYTE SULFATEE COMPACTE.

**(Globular.)**

- No. 18. AGATE.  
ACHAT.  
*from Tefeld Harz.*

**(Knobby.)**

- No. 19. MENILIT.  
QUARTZ RESINITE. (*Leberopal*).  
*from Menil Montant, near Paris.*

**(Botryoidal.)**

- No. 20. RED IRON-ORE. (*Jameson*).  
ROTHEISENSTEIN. (*Werner*).  
FER OLIGISTE. (*Haüy*).  
*from Eibenstock in Saxony.*

**(In joined globules.)**

- No. 21. PISIFORM LIMESTONE.  
ERBSSENSTEIN. (*Werner*).  
CHAUX CONCRETIONNEE CARB.  
(*Globuliforme*).  
*from Carlsbad.*

**(Oolitic.)**

- No. 22. CLAY IRON STONE.  
 THONEISENSTEIN.  
 FER OXYDE ARGILIFERR.  
*from Aalen, Wurtemberg.*

**(Lentil shaped.)**

- No. 23. CLAY IRON STONE.  
 THONEISENSTEIN.  
 FER OXYDE ARGILIFERR.  
*from Radnitz, Bohemia.*

**(Reniform.)**

- No. 24. BLACK MANGANESE ORE. (*Jam*).  
 HARTMANGANERZ.  
 MANGANESE OXYDE.  
*from Langeberg near Schwarzenberg.*

**(Stalactitic.)**

- No. 25. FIBROUS BROWN HEMATITE.  
 FASRIGER BRAUNEISENSTEIN.  
 LIMONITE FIBREUSE.  
*from Lobenstein in the Russias.*

**(Shrub shaped.)**

- No. 26. ARRAZONITE.  
 EISENBLUTHE. (*Werner*).  
 FLOSFERRI.  
*from Eisenerz in Steyermark.*

**(Acicular.)**

- No. 27. NEEDLE ZEOLITE.  
 MESOTYPSPATH-NATROLITH in  
 Klingstein.  
 ZEOLITE EN AIGUILLES.  
*from Aussig in Bohemia.*

**(Forming plates.)**

- No. 28. OCTOHEDRAL COPPER.  
 GEDIGEN KUPFER.  
 CUIVRE NATIF.  
*from Rheinbriethbadh.*

**(Cellular.)**

- No. 29. RADIATED PYRITES.  
 STRAHLKIES. (*W.*)  
 PYRITE RAYONNEE (*Brochant*).  
*from Bodenmais, Bavaria.*

**(Porous.)**

- No. 30. GLASSY-PUMICE. (*Jameson*).  
 BIMSTEIN.  
 LAVE VITREUSE PUMICER.  
*from the Volcano. (Lapari Island).*

**(Drusy.)**

- No. 31. NEEDLE ZEOLITE.  
 NADEL-MESOTYP in Basalt.  
 ZEOLITE in Aiguilles.  
*from Linz, Rhine.*

**(Drusy.)**

- No. 32. TOADSTONE.  
 MANDELSTEIN with Zeolite.  
 PIERRE AMYGDALOIDE.  
*from Kaiserstahl in Baden.*

**(Drusy.)**

- No. 33. TOADSTONE.  
 MANDELSTEIN, with green earth  
 and zeolites.  
 PIERRE AMYGDALOIDE.  
*from Far Oer.*

**(Marbled.)**

- No. 34. OTTRELITE IN CLAY SLATE.  
KIESEL-THON-EISENOXYD.  
MANGANOXYD. WASSER.  
*from Ottrez in Limburg.*

**(Marbled.)**

- No. 35. ARENACEOUS LEAD ORE.  
MINK DE PLOMB ARENACE.  
BLEISANDERZ. KNOTEMERZ.  
*from Commeru in the Eifel.*

**(Forming a thin cover.)**

- No. 36. CHROMATE OF LEAD. (*Phill*).  
ROTHBLEIERZ. KALLOCHROM.  
(*Hausur*).  
PLOMB CHROMATE. (*Häuy*).  
*from Beresowsk in the Ural.*

**(Polished by nature.)**

- No. 37. TIN WHITE COBALT. (*Phillips*).  
SPREISKOBALT.  
SMALTIN. (*Haid*). (*Werner*).  
COBALT ARSENICAL. (*Häuy*).  
*from Schneeberg in Saxony.*

**(Flowery leaved.)**

- No. 38. PRISMATIC FELSPAR. (*Jameson*).  
FELDSPATH (W.) ORTHOKLAS.  
(*Breith*).  
ORTHOSK. (*Beud*).  
*from Brietenbrunn Saxony.*

**(With corroded surface.)**

- No. 39. BASALTIC HORNBLENDE.  
BASALTISCHE HORNBLENDE.  
(*Werner*).  
AMPHIBOLE BASALTIQUE.  
*from Schima in Bohemia.*

**(Flowered.)**

- No. 40. GALENA.  
BLEIGLANZ. (*Werner*).  
GALENE ; PLOMB SULFURE.  
(*Häuy*).  
*from Freiberg in Saxony.*



## CRYSTALLOGRAPHY.

---

THE regular forms assumed by minerals are well known under the name of crystals, and the part of mineralogy which refers to it is thence called CRYSTALLOGRAPHY, or a description of Crystals. Each substance usually exhibits a peculiar crystalline form of its own, although occasionally the same substance crystallises in two distinct and incompatible forms, in which case it is said to be *dimorphous*, from (*dis*) twice and (*morphé*) form. Some times also two substances are found having the same crystalline form and they are then said to be *isomorphous*, from (*isos*) like and (*morphe*) form.

Pseudo-morphism (*pseudos*, false, *morphé*, form,) or the occurrence of a mineral in a form not its own, and not obtained by the regular process of crystallisation, occurs in various minerals, and is chiefly owing to external conditions which have limited the direction and extent of the development of the mineral.

---

## MINERALS

TO ILLUSTRATE

### PSEUDOMORPHISM.

---

- |   |  |
|---|--|
| <p>No. 1. TIN STONE, in the form of felspar.<br/><i>from St. Agnes, Cornwall.</i></p>                 | <p>No. 3. GYPSUM, in the form of Rock Salt.<br/><i>from Gosling, Upper Austria.</i></p>  |
| <p>No. 2. CARBONATE OF LIME, in the form of Gay Lussite.<br/><i>from Sangerhausen, Thuringia.</i></p> | <p>(Assuming the form of Nepheline.)<br/>No. 4. LIEBENERIT, (<i>Stotter</i>) in Porphyry.<br/><i>from Predazzo in Tyrol.</i></p> |

No. 5. **STREATITE**, (taking the form of Spinel).  
*from the Monzoni in South-Tyrol.*

(Assuming the form of **Iolite** : syn : **Dichroite**.)

No. 6. **CHLOROPHYLLITE**. (*Jackson*).  
*from Kuddam, Connecticut.*

(Assuming the form of **Red Copper Ore**.)

No. 7. **MALACHITE**.  
*from Chessy near Lyons.*

No. 8. **SERPENTINE**, in the form of Felspar.  
*from Tredazzo, Tyrol.*

No. 9. **QUARTZ**, in the form of Fluor Spar.  
*from Breonde, Department of the Haute Loire.*

No. 10. **HORNSTONE**, in the form of Calcite.  
*from Schneeberg, Saxony.*

No. 11. **SANDSTONE**, in the form of Rock salt.  
*from Geolstein, Eifel.*

No. 12. **HEMATITE**, in the form of Pyrites.  
*from the Spitzleite in Erzgebirge.*

No. 13. **QUARTZ**, in the form of Barytes.  
*from Toplitz Bohemia.*

(With impressions of Barytes.)

No. 14. **IRON-PYRITES**.  
*from Tavistock in Devonshire.*

(Passing into Mica.)

No. 15. **PRISMATIC ANDALUSITE**. (*Jameson*).  
*from Lienz in Tyrol.*

(Decomposed to brown Iron Ore.)

No. 16. **HEXAHEDRAL IRON-PYRITES**. (*Jameson*).  
*from Beresowsk, Ural.*

No. 17. **QUARTZ**, in the form of Anhydrite.  
*from Geyer, Saxony.*

(Assuming the form of **Pyroxene**.)

No. 18. **GREEN-EARTH**.  
*from the val di Fassa in Tyrol.*

No. 19. **CARBONATE OF LIME**, in the form of Felspar.  
*from Mambach, Thuringia.*

No. 20. **QUARTZ**, covering crystals of heavy spar.  
*from Tavistock Devonshire.*

# MINERALS

TO ILLUSTRATE

## TWIN CRYSTALS.

IN their primitive forms crystals never present re-entering angles,—but such appearances are not unfrequent when two or more crystals grow as it were out of one base. Sometimes there is a certain degree of symmetry in the way in which individuals of a group collect themselves together, as in the crop-like form, usually assumed by the mineral called staurotide, and usually Twin Crystals as such cases are sometimes called, called also ‘macles,’ exhibit distinct marks of their origin.

## TWIN CRYSTALS.

No. 1. AUGITE. (*Jameson*).  
GEMMINER AUGIT. (*Werner*).  
PYROXENE. (*Häuy*).  
*from Schöna in Bohemia.*

No. 2. SPHENE. (*Häuy*).  
SPHKN (*Karsten*) ; TITANIT  
(*Klapr*).  
*from St. Gotthard.*

No. 3. GYPSUM.  
GYPS.  
CHAUX SULFATEE.  
*from Girgenti, Sicily.*

No. 4. CARBONATE OF LEAD.  
WISSBLEIERZ.  
PLOMB CARBONATEE.  
*from Diepenlieden near Aix la Chapelle.*

No. 5. PYRAMIDO-PRISMATIC ZEOLITE.  
(*Jam*).  
HARMOTOM, KREUTZSTEIN.  
(*Werner*).  
PIERRE CRUCIFORME.  
*from Andreasberg in the Harz.*

No. 6. LEVYNE. (*Brewster*).  
*from Leipa in Bohemia.*

## No. 7. TINSTONE.

ZINNSTEIN. (*Werner*).ETAÏN OXYDE. (*Haüy*).*from Schlackenwalde in Bohemia.***Twin faces (*Miller*.)**No. 8. PRISMATIC FELSPAR. (*Jame-son*).ADULAR. (*Werner*).FELDSPATHE. (*Haüy*).*from St. Gotthardt,*No. 9. PRISMATIC FELSPATH. (*Jame-son*).FELDSPATH. (*W*) ORTHOKLAS. (*Breith*).ORTHOSE. (*Beud*).*from Hirschberg in Silesia.*

## No. 10. MAGNETIC IRON.

MAGNETKISEN. (*Werner*).

FER OXYDULR.

*from Greiner, Tyrol.*

## No. 11. CLEAVELANDITE.

ALBITE, TETARTIN.

*from Shezing, Tyrol.*No. 12. PRISMATIC FELSPAR. (*Jame-son*).ADULAR. (*Werner*).FELDSPATHE. (*Haüy*).*from St. Gotthardt.*

# MINERALS

## TO ILLUSTRATE

### AGGREGATION AND FRACTURE.

ALTHOUGH by proper management and a skilful hand, by splitting off parallel faces of various thickness or by removing edges or angles which may have replaced faces, it is possible to obtain an ultimate or primitive form of each crystal,—simple minerals are often so constructed and built up of like parts, aggregated as it is termed, as to appear in forms dissimilar to the ultimate or primitive crystals.

When a mineral breaks in a direction different from the cleavage planes it forms fracture surfaces, and the form of the fracture may be *conchoidal*, *even*, *uneven*, *smooth*, *splintery*, *hackly*, or *earthy*.

### AGGREGATION.

(Rhombohedrons aggregated to globular.)	(On Orthoclase.)
No. 1. CARBONATE OF LIME. ( <i>Phill</i> ). KALKSPATH. CALCIT. ( <i>Haid</i> ). CHAUX CARBONATE. ( <i>Haüy</i> ). <i>from Maxen near Dresden.</i>	No. 4. CLRAVELANDITE. ( <i>Brooke</i> ). ALBIT. TETARTIN. ( <i>Breithaupt</i> ). <i>from Hirschberg in Silesia.</i>
(Rhombohedrons aggregated to skalene dodecahedrons.)	(On orthoclase, in regular situation.)
No. 2. CARBONATE OF LIME. ( <i>Phill</i> ). KALKSPATH. CALCIT. ( <i>Haid</i> ). CHAUX CARBONATE. ( <i>Haüy</i> ). <i>from Freiberg in Saxony.</i>	No. 5. CLRAVELANDITE. ( <i>Brooke</i> ). ALBIT. TETARTIN. ( <i>Breithaupt</i> ). <i>from Hirschberg in Silesia.</i>
(Hexahedrons aggregated to dodecahedrons.)	(On Orthoclase.)
No. 3. FLUOR SPAR. FLUSSSPATH. CHAUX FLUATE. <i>from Elwensfriedersdorf, Saxony.</i>	No. 6. CLEAVELANDITE. ( <i>Brooke</i> ). ALBIT. TETARTIN. ( <i>Breithaupt</i> ). <i>from Hirschberg in Silesia.</i>

- No. 7. GRANITE, GRAPHIC.  
SCHRIFTGRANIT.  
*from Zweiesel, Bavaria.*

(On Iron glance.)

- No. 8. PRISMATO-PYRAMIDAL-TITANIUM ORE.  
RUTIL.  
TITANE OXYDE.  
*from St. Gothard.*

(Joined with Starbide.)

- No. 9. PRISMATIC KYANITE. (*Jameson*).  
KYANIT. (*Werner*). KYANITH.  
(*Breith*).  
DISTHENE. (*Häuy*).  
*from St. Gotthardt.*

### FRACTURE.

**Very difficult to break by striking with a hammer.)**

- No. 10. OCTOEDRAL COPPER.  
GEDIEGEN KUPFER.  
CUIVRE NATIF.  
*from Katherinenberg in the Ural.*

**(Very difficult to break by striking with a hammer.)**

- No. 11. NEPHRITE.  
CERAUNITE.  
JADE NEPHRITIQUE. (*Häuy*).  
*from China.*

**(Very difficult to break.)**

- No. 12. FIGURE-STONE, AXE STONE.  
(*James*).  
BEILSTEIN. (*Werner*). BILDSTEIN.  
TALC GLAPHIQUE.  
*from Ochsenkopf in Saxony.*

**(Very difficult to break by the strokes of a hammer.)**

- No. 13. COMMON ASBESTUS.  
ASBEST GRMEINER.  
*from Sala, Sweden.*

**(Very difficult to break by the strokes of a hammer.)**

- No. 14. FIBROLITE. (*Bournon*).  
FASERKIESEL.  
*from Bodenmais in Bavaria.*

**(Difficult to break.)**

- No. 15. BASALT.  
OLIVIN UND TITANEISEN EINSCHTIESSEND.  
*from Unkel on the Rhine.*

**(Difficult to break.)**

- No. 16. MEERSCHAUM.  
MAGN : CARB : SILICIF : SPON-  
SIEUSE.  
ECUME DE MER.  
*from Natalia.*

**(Less difficult to break.)**

- No. 17. HORNSTONE.  
HORNSTEIN.  
QUARTZ AGATE GROSSIER.  
*from Rugen.*

**(Easily broken.)**

- No. 18. SEMI-OPAL.  
HALBOPAL.  
*from Bilin, Bohemia.*

**(Very easily broken.)**

- No. 19. PRISMATIC SULPHUR.  
 SOUFRE. (*Haüy*).  
 SCHWKFEL. NATURLICHER.  
*from Girgenti in Sicilia.*

**(Friable.)**

- No. 20. PORCELAIN-EARTH.  
 KAOLIN, PORZELLANERDE.  
 (*Werner*).  
 FELDSPATH DECOMPOSE.  
 (*Haüy*).  
*from Aue in Saxony.*

**(Flowing with difficulty.)**

- No. 21. BLACK MINERAL OIL. (*Jame-  
 son*).  
 THERIGES ERDOIL. (*Werner*)  
 BITUME LIQUID NOIR (*Haüy*)  
*from Salso in Parma.*

**(Liquid.)**

- No. 22. YELLOW MINERAL OIL. (*Jame-  
 son*).  
 GELBES ERDOIL. (*Werner*).  
 BITUME LIQUIDE JAUNE.  
 (*Haüy*)  
*from Miamo in Parma.*

**(Feeling rough.)**

- No. 23. TRIPOLI.  
 TRIPEL. (*Werner*).  
*from Meissen Berg near Prague.*

**(Feeling soft.)**

- No. 24. MYRLIN. (*Breith*).  
 TALKSTEINMARK. (*Freiesleben*).  
*from Rochlitz in Saxony.*

**(Feeling greasy.)**

- No. 25. RHOMBOIDAL GRAPHITE.  
 GRAPHIT.  
 GRAPHITE.  
*from Ceylon.*

**(Feeling greasy.)**

- No. 26. AGALMATOLITE.  
*from Saczka, Banat.*

**(Dissolving in water.)**

- No. 27. FULLERS EARTH.  
 WALKERDE  
 TERRE A FOULON.  
*from Reifenstein near Cilly.*

**(Becoming translucent in water.)**

- No. 28. EHRENBERGIT. (*Nöggerath*).  
*from Drachenfels in the Siebengebirge.*

**(Writing.)**

- No. 29. ROTHEL. (CLAY MIXED WITH  
 RED OXYD OF IRON).  
*from Eiberstock, Saxony.*

**(Writing.)**

- No. 30. BLACK CHALK.  
*from Osnabruck.*

**(Elastic.)**

- No. 31. MICA.  
 ZWIKXIGER GLIMMER.  
 MUSCOVITE. (*Dana*).  
*from Miask in the Ural.*

**(Elastic.)**

- No. 32. ELASTIC BITUMEN.  
ELATKRIT. (*Hausmann*).  
BITUME ELASTIQUE. (*Haüy*).  
*from Castleton in Derby-shire.*

**(Elastic, sounding.)**

- No. 33. GYPSUM.  
GYPS,  
CHAUX SULFATÉE.  
*from Montmartre near Paris.*

**(Ductile.)**

- No. 34. HEXAHEDRAL SILVER-GLANCE.  
(*Jameson*).  
GLASERZ. (*Werner*). SILBER-  
GLANZ. (*Breith*).  
ARGENT SULFUR. (*Haüy*).  
*from Freiberg.*

**(Ductile.)**

- No. 35. SILVER HORN-ORE. (*Jameson*).  
HORNKRZ. (*Werner*).  
ARGENT MURIATÉ. (*Haüy*).  
*from Cogniapo, Chile.*

**(Less Ductile.)**

- No. 36. NONTRONIT. (*Berthier*).  
*from Andreasberg in the Harz.*

**(Ductile.)**

- No. 37. OZOKERITE. (*Glocker*).  
ERDWACHS.  
*from Slanik in Moldavia.*

**(Less Ductile.)**

- No. 38. BITUMEN. (*Dana*).  
ASPHALT; ERDPFACH.  
BITUME GLUTINEUX.  
*from Lobsan, Dpt. of the Bas-Rhin.*

**(Less Ductile.)**

- No. 39. VITREOUS COPPER. (*Jameson*).  
KUPFERGLANZ, KUPFERGLAS.  
(*Werner*).  
CUIVRE SULFURE. (*Haüy*).

**(Mild Sextile.)**

- No. 40. GALKNA. (*Phill*).  
BLEIGLANZ. (*Werner*).  
PLOMB SULFURE. (*Haüy*).  
*from Freiberg, Saxony.*

**(Mild.)**

- No. 31. STEATITE. (*Jameson*). SOAP-  
STONE.  
SPECKSTEIN. (*Werner*). STEA-  
TIT.  
TALC STEATITE. (*Haüy*).  
*from Wunsiedel in Bavaria.*

**(Malleable.)**

- No. 42. HEXAHEDRAL SILVER. (*Jameson*).  
GEDIEGEN SILBER.  
ARGENT NATIF. (*Haüy*).  
*from Schneeberg, Saxony.*

**(Flexible.)**

- No. 43. AXIFRANGIBLE GYPSUM.  
(*James*).  
FRAUENEIS. (*Gyps*). (*Werner*).  
CHAUX SULFATÉE. (*Haüy*).  
*from Eisleben.*



**(Brittle.)**

- No. 44. KEROLITE.  
KEROLITH. (*Breith*). HYDRO-  
SILICIT. (*Kuh*).  
*from Frankenstein in Silesia.*

**(Weak.)**

- No. 45. ASPHALT.  
BITUME SOLIDE.  
*from Merthyr Tydvill, Devon.*

**(Even fracture.)**

- No. 46. RIBBON JASPER.  
BANDJASPI. S.  
JASPE RUBANE.  
*from Lerbäch in the Harz.*

**(Even fracture.)**

- No. 47. COMMON SERPENTINE.  
SERPENTIN.  
OPHIOLITE.  
*from Reichenstein, Silesia.*

**(Even and Splintery.)**

- No. 48. HELIOTROPE.  
HELIOTROP. (*Werner*).  
QUARZ AGATHE PONCTUE.  
*from the East.*

**(Even fracture.)**

- No. 49. GALENA.  
BLEISCHWEIF.  
PLOMB SULFURE.  
*from Clausthal.*

**(Uneven fracture.)**

- No. 50. LEPTYNITE. (*Z. Th.*)  
HORNFELS.  
*from Andreasberg in the Harz.*

**(Uneven and Splintery.)**

- No. 51. COMMON QUARTZ.  
GEMMINKER QUARZ.  
*from Freiberg, Saxony.*

**(Uneven fracture.)**

- No. 52. COMMON QUARTZ—FRESHWA-  
TER QUARTZ.  
GEMMINKER QUARZ.  
*from Muffindorf near Bonn, on the Rhine.*

**(Uneven fracture.)**

- No. 53. TRACHYTE.  
TRACHYT.  
*from der Rosenau in the Siebengebirge.*

**(Uneven fracture.)**

- No. 54. PORCELAIN JASPER.  
PORZELLAN-JASPI. (*Werner*).  
JASPE PORCELLAINK.  
*from Töplitz.*

**(Uneven fracture.)**

- No. 55. HEXAHEDRAL IRON-PYRITES.  
(*Jameson*).  
SCHWEFELKIES. (*Werner*).  
FER SULFURE. (*Haüy*).  
*from Traverrella, Piedmont.*

**(Splintery.)**

- No. 56. ALABASTER.  
GESSO.  
KORNIGER GYPS.  
ALABATRE.  
*from Castellina in Tuscany.*

**(Splintery fracture.)**

- No. 57. ANHYDRITE. (*Jameson*).  
ANHYDRIT DICHTER. (*Werner*).  
CHAUX SULFATEE ANHYDRE.  
(*Hy*).  
*from Sulz in Neckar.*

**(Splintery.)**

- No. 58. COMMON SERPENTINE.  
SERPENTIN.  
OPHIOLITE.  
*from Pfanders, Tyrol.*

**(Splintery fracture.)**

- No. 59. COMPACT FELSPAR.  
FELDSTEIN. ADINOLE. HAL-  
LEFLINTE.  
PETROSILKX. (*Beud.*)  
*from Sala Sweden.*

**(Splintery fracture.)**

- No. 60. HORNSTONE.  
HORNSTEIN. (*Werner*).  
QUARZ AGATHA GROSSIER.  
*from Frankenstein in Silesia.*

**(Splintery.)**

- No. 61. COMMON CALCEDONY.  
CALZEDON.  
CALCEDOINE.  
*from Oberstein.*

**(Splintery fracture inclining to Conchoidal.)**

- No. 62. COMMON QUARTZ.  
GEMKINER QUARZ.  
*from Zinnwald, Bohemia.*

**(Conchoidal fracture.)**

- No. 63. HORNSTONE. (Brown Coal for-  
mation).  
HORNSTEIN.  
QUARTZ AGATE GROSSIER.  
*from Rolt near Bonn.*

**(Conchoidal fracture.)**

- No. 64. FLINT.  
FEUERSTEIN.  
SILEX PYROMAQUE.  
*from Schonen.*

**(Conchoidal fracture.)**

- No. 65. JASPER.  
KUGELJASPIE.  
JASPR.  
*from Kandern in Baden.*

**(Conchoidal fracture.)**

- No. 66. SEMI OPAL.  
HALBOPAL.  
*from Königswinter on the Rhine.*

**(Conchoidal fracture.)**

- No. 67. OBSIDIAN. (*Werner*).  
OBSIDIENNE.  
*from the Lipari Islands.*

**(Conchoidal fracture.)**

- No. 68. MAGNESITE. (*Jameson*).  
MAGNESIT, TALKERDE. (*Werner*).  
MAGNESIECARBONATKE. (*Häuy*).  
*from Frankenstein in Silesia.*

**(Earthy fracture.)**

- No. 69. LITHOMARGE. (*Freiesleben*).  
STEINMARK. (*Werner*).  
ARGILE LITHOMARGE. (*Häuy*).  
*from the Harz.*

**(Slaty.)**

- No. 70. DEVONIAN CLAY-SLATE.  
THONSCHIEFER.  
ARDOISE.  
*from Caub on the Rhine.*

# MINERALS

TO ILLUSTRATE

## CLEAVAGE.

MINERALS are found to vary much in the degree of coherence existing among the various parts of which they consist,—and whilst some can with difficulty be broken, others yield to the slightest blow. Even in the same species cohesion varies in different directions and there are certain planes at right angles to which it seems to be at a minimum, so that the mineral separates along or parallel to these planes far more readily than in any other direction. This property is termed Cleavage, and the planes thus formed, Cleavage planes.

## CLEAVAGE.

<p>No. 1. FLUOR-SPAR. FLUSSSPATH. CHAUX FLUATEE. <i>from Beer-Alston Devonshire.</i></p>	<p>No. 4. GRAY OXIDE OF MANGANESE. MANGANIT. (<i>Haid</i>). GRAU- BRAUNSTEIN. (<i>Hausm</i>). ACERDESE. (<i>Beud</i>). <i>from Ihlefeld in the Harz.</i></p>
<p>No. 2. TUNGSTATE OF IRON. (<i>Phil- lips</i>). WOLFRAM. (<i>Werner</i>). SCHEELIN FERRUGINEUX. (<i>Häuy</i>). <i>from Zinnwald in Bohemia.</i></p>	<p>No. 5. PRISMATIC FELSPAR. (<i>Jameson</i>). FELDSPATH (W.) ORTHOKLAS. (<i>Breith</i>). ORTHOSE. (<i>Beud</i>). <i>from Lunguarruk (Greenland).</i></p>
<p>No. 3. PRISMATO-PYRAMIDAL TITANIUM ORE. RUTIL. TITANE OXYDE.</p>	<p>No. 6. CRIOLITE. KRIOLITH, EISSTEIN. ALUMINE FLUATEE ALCALINE, <i>from Ivikaet in West Greenland.</i></p>

- |   |   |
|---|---|
| <p>No. 7. CUBE SPAR, PRISMATIC GYPSUM. (<i>Jam.</i>)<br/>         ANHYDRITSPAR, MURIAZIT. (<i>Werner</i>).<br/>         CHAUX SULFATER ANHYDRE. (<i>Haiiy</i>).<br/> <i>from Hall, Tyrol.</i></p> <p>No. 8. SCAPOLITE.<br/>         SKAPOLITH. (<i>Wernerit</i>).<br/> <i>from Guljõe, Sweden.</i></p> <p>No. 9. HEXAHEDRAL ROCK-SALT. (<i>Jam.</i>)<br/>         STEINSALZ.<br/>         SOUDE MURIATEE. (<i>Haiiy</i>).<br/> <i>from Wieliczka.</i></p> <p>No. 10. HEAVY SPAR; BARYTES.<br/>         SCHWERSPATH; BARYTE.<br/>         BARYTE SULFATEE.<br/> <i>from Töplitz, Bohemia.</i></p> <p>No. 11. COMMON BERYL.<br/>         GEMEINER BERYLL.<br/>         EMERAUDE; BERIL.<br/> <i>from Limoges in Francouid.</i></p> <p>No. 12. GALENA.<br/>         BLEIGLANZ. (<i>Werner</i>).<br/>         GALENK; PLOMB SULFURE. (<i>Haiiy</i>).<br/> <i>from Freiberg in Saxony.</i></p> <p>No. 13. SULPHURET OF ZINC.<br/>         ZINK BLENDE.<br/>         ZINC SULFURE.<br/> <i>from the Harz.</i></p> | <p>No. 14. CELESTINE.<br/>         COELESTIN. (<i>Werner</i>).<br/>         STRONTIANE SULFATH.<br/> <i>from Strontian.</i></p> <p>No. 15. CARBONATE OF LIME. (<i>Phill.</i>)<br/>         KALKSPATH. CALCIT. (<i>Haid.</i>)<br/>         CHAUX CARBONATEE. (<i>Haiiy</i>).<br/> <i>from Borion Westphalia.</i></p> <p>No. 16. TRIPHANE.<br/>         SPODUMEN.<br/>         LITHION-SPODUMEN.<br/> <i>from Sterling, Massachussets.</i></p> <p>No. 17. MICA.<br/>         GLIMMER. (<i>Werner</i>). ZWEI-<br/>         AXIGER.<br/> <i>from Zinnwald in Bohemia.</i></p> <p>No. 18. AXIFRANGIBLE GYPSUM.<br/>         (<i>James.</i>)<br/>         FRAUENEIS. (<i>Gyps</i>) (<i>Werner</i>).<br/>         CHAUX SULFATEE. (<i>Haiiy</i>).<br/> <i>from Eisleben.</i></p> <p>No. 19. COMMON AMPHIBOLE.<br/>         HORNBLENDE IN TRACHYTE.<br/>         AMPHIBOLE COMMON.<br/> <i>from Stenzelberg in the Siebengebirge.</i></p> <p>No. 20. ICTHYOPHTHALMITE.<br/>         APOPHYLLIT, TESSELIT. (<i>Brewster</i>).<br/>         APOPHYLITE. (<i>Haiiy</i>).<br/> <i>from Andreasberg in the Harz.</i></p> |
|---|---|

## MINERALS

TO ILLUSTRATE

## MOHS' AND BREITHAUP'T'S DEGREES OF HARDNESS.

THE hardness of minerals, or the power of resisting any attempt to separate their parts, is an important character, and being a purely relative distinction two scales have been formed by *MM. Breithaupt* and *Mohs*, composed of well known minerals of which each preceding one is scratched by those preceding it while the latter does not scratch the former. Mohs' scale reckons ten and Breithaupt's twelve degrees of hardness.

## MOHS' AND BREITHAUP'T'S DEGREES OF HARDNESS.

(Hardness—1 Breithaupt; 1 Mohs.)	(Hardness—4 Breithaupt; 3 Mohs.)
No. 5. PRISMATIC TALC MICA. ( <i>Jameson</i> ). TALK. ( <i>Werner</i> ). TALC. ( <i>Häuy</i> ). <i>from Greiner in the Tyrol.</i>	No. 2. CALCITE, ( <i>Dana</i> ); CALCAREOUS SPAR. KALKSPATH. CHAUX CARBONATEE. <i>from Andreasberg in the Harz.</i>
(Hardness—2 Breithaupt; 2 Mohs.)	(Hardness—5 Breithaupt; 4 Mohs.)
No. 12. GYPSUM. GYPS. CHAUX SULFATÉE. <i>from Esleben.</i>	No. 6. FLUOR-SPAR. FLUSS SPATH. CHAUX FLUATÉE. <i>from Stallberg, Harz.</i>
(Hardness—3 Breithaupt; 2.5 Mohs.)	(Hardness—6 Breithaupt; 5 Mohs.)
No. 11. MICA. GLIMMER, ZWEIAXIGER. ( <i>Werner</i> ). <i>from Zinnwald in Bohemia.</i>	No. 9. RHOMBOHEDRAL APATITE. ( <i>Jameson</i> ). APATIT. ( <i>Werner</i> ). CHAUX PHOSPHATEE. ( <i>Häuy</i> ). <i>from Arendal Norway.</i>

20 PHYSICAL CHARACTERS OF MINERALS. DEGREES OF HARDNESS.

(Hardness—7 Breithaupt ;  
5.5 Mohs.)

- No. 4. GLASSY ACTINOLITE.  
GLASSIGER STRAHLSTEIN.  
AMPHIBOLE VITREUX.  
*from Greiner in the Tyrol.*

(Hardness—8 Breithaupt ; 6 Mohs.)

- No. 3. PRISMATIC FELSPAR. (*Jameson*).  
ADULAR. (*Werner*).  
FELDSPATHE. (*Haüy*).  
*from St. Gothard.*

(Hardness—9 Breithaupt ; 7 Mohs.)

- No. 1. ROCK CRYSTAL.  
BERG KRISTALL,  
QUARZ HYALIN.  
*from Järschan in Silesia.*

Hardness—10 Breithaupt ; 8 Mohs.)

- No. 8. PRISMATIC TOPAS.  
TOPAS. (*Werner*).  
ALUMINE FLUATE SILICURE.  
*from Villa Rica in Brasil.*

(Hardness—11 Breithaupt ; 9 Mohs.)

- No. 7. RHOMBOIDAL CORUNDUM.  
(*Jameson*).  
KORUND. DEMANTSPATH.  
(*Werner*).  
CORINDON. (*Haüy*).  
*from China.*

(Hardness—12 Breithaupt ;  
10 Mohs.)

- No. 10. OCTOHEDRAL DIAMOND.  
DEMANT. (*Werner*).  
DIAMANT. (*Haüy*).  
*from Minas Geraes in Brasil.*

# MINERALS

TO ILLUSTRATE

## LUSTRE AND COLOUR.

THE optical property of minerals are such as depend on light and are only observable in its presence. They include Lustre and Colour.

Lustre depends on the nature of the surface of a mineral, which causes light to be reflected in different ways and to a different extent. There are thus various kinds of lustre, Metallic, Vitreous, Resinous, Pearly, Silky, and Adamantine, and many degrees of Lustre as Splendent, Shining, Glistening, Glimmering and Dull.

Nos. 1—35. *Metallic Lustre and Colours.*

36—111. *Non-Metallic Colours.*

112—120. *Tarnish, Dichroism or Polychroism.*

## METALLIC LUSTRE.

### (Metallic lustre.)

No. 1. GRAY ANTIMONY ORE.  
ANTIMONGLANZ.  
ANTIMOINE SULFURE.  
*from the Caspari-Zeche near Arensburg.*

### (Metallic lustre.)

No. 2. IRON PYRITES.  
SCHWEFELKIES. (*Werner*).  
PYRITE,  
*from Traversella in Piedmont.*

### (Sub-metallic lustre.)

No. 3. TUNGSTATE OF IRON. (*Phillips*).  
WOLFRAM. (*Werner*).  
SCHEELIN FERRUGINEUX.  
(*Haidy*).  
*from Zinnwald in Bohemia.*

### (Sub-metallic lustre.)

No. 4. COAL HOUILLE.  
STEINKOHLE. BLATTERKOHLE.  
*from Essen on the Ruhr.*

**(Vitreous lustre.)**

- No. 5. ROCK CRYSTAL. (*Jameson*).  
BERGKRISTALL.  
QUARZ-HYALIN. (*Häuy*).  
*from St. Gothard.*

**(Vitreous lustre.)**

- No. 6. CALCITE. (*Dana*); CALCAREOUS SPAR.  
KALKSPATH.  
CHAUX CARBONATÉE.  
*from Adreasberg in the Harz.*

**(Resinous lustre.)**

- No. 7. VESUVIAN. (*Jameson*).  
VESUVIAN. (*Werner*).  
(FETTGLANZ.) IDOCRASE.  
(*Häuy*).  
*from Vesuvius.*

**(Resinous lustre.)**

- No. 8. PITCHSTONE.  
PECHSTEIN.  
PIKRE DE POIX.  
*from Buschbad near Meissen.*

**(Resinous lustre.)**

- No. 9. SEMI OPAL.  
HALBOPAL.  
*from Königswinter on the Rhine.*

**(Wavy lustre.)**

- No. 10. SEMI OPAL.  
HALBOPAL.  
*from Königswinter on the Rhein.*

**(Pearly lustre.)**

- No. 11. STILBITE. (*Dana*).  
DESMIN. (*Breithaupt*);  
STRAHLZKOLITH.  
STILBIT. (*Häuy*).  
*from Farøe.*

**(Pearly lustre.)**

- No. 12. MARGARIT. (*Fuchs*).  
PERLGLIMMER. (*Mohs*).  
*from Pfitsch-Thal in Tyrol.*

**(Pearly lustre.)**

- No. 13. GILBERTIT. (*Thomson*).  
*from St. Just in Cornwall.*

**(Metallic pearly.)**

- No. 14. COMMONSCHILLER-SPAR. (*Jam.*)  
SCHILLERSPATH.  
DIALLAG METALLOIDE.  
*from the Baste in the Harz.*

**(Metallic pearly lustre.)**

- No. 15. DIALLAG (WITH SAUSSURITE).  
BRONCITE.  
*from Imprunella, Tuscany.*

**(Silky lustre.)**

- No. 16. FIBROUS GYPSUM.  
FASRIGER GYPS.  
CHAUX SULFATÉE FIBREUSE.  
*from Nordhausen Thuringia.*



**(Adamantine lustre.)**

- No. 17. SULPHURET OF ZINC.  
 BLENDE.  
 ZINC SULFURE.  
*from Neudorf, Harz.*

**(Splendent.)**

- No. 18. IRON GLANCE.  
 EISENGLANZ.  
 FER OLIGISTE.  
*from Rio, Elba.*

**(Splendent.)**

- No. 19. ROCK CRYSTAL.  
 BERGKRISTALL.  
 QUARZ HYALIN.  
*from Järischän in Siberia.*

**(Shining.)**

- No. 20. CELESTINE.  
 COELESTIN. (*Werner*).  
 STRONTIANK SULFATE.  
*from Girgenti in Sicilia.*

**(Glistening.)**

- No. 21. CARBONATE OF IRON. CHALY-  
 BITE. (*Miller*).  
 SPATHEISENSTEIN. SIDERIT.  
 (*Haid*).  
 FER OXYDE CARBONATE.  
 (*Häuy*).  
*from Lobenstein.*

**(Glimmering.)**

- No. 22. COMMON CALCEDONY.  
 CALZEDON.  
 CALCEDOINE.  
*from Island.*

**(Glimmering.)**

- No. 23. HELIOTROPE.  
 HELIOTROP. (*Werner*).  
 QUARZ AGATHE PONCTUE.  
*from the Sria.*

**(Dull.)**

- No. 24. PLASMA. (*Werner*).  
 QUARTZ AGATK VERT.  
*from Ofenburg in Baden.*

**(Dull.)**

- No. 25. STRIPED JASPER.  
 BANDJASPI. (*Werner*).  
 JASPE RUBANNE.  
*from Gmundstein near Altenburg.*

**METALLIC COLOURS.**

*By colour is meant the colour of the  
 entire mineral.*

**(Copper red.)**

- No. 26. OCTOHEDRAL COPPER.  
 GEDIEGEN KUPFER.  
 CUIVRE NATIF.  
*from the Lizard in Cornwall.*

**(Bronze yellow.)**

- No. 27. MAGNETIC PYRITES. (*Jame-  
 son*).  
 MAGNETKIES.  
 FER SULFURE.  
*from Bodenmais in. Bavaria.*

**(Brass yellow.)**

- No. 28. COPPER PYRITES. (*Phill.*)  
KUPFERKIES, CHALKOPYRIT.  
(*Haid.*)  
CUIVRE PYRITEUX. (*Haüy.*)  
*from Tavistock, Devonshire.*

**(Silver white.)**

- No. 29. HEXAHEDRAL SILVER. (*Jameson.*)  
GEDIEGEN SILBER.  
ARGENT NATIF. (*Haüy.*)  
*from Schneeberg, Saxony.*

**(Silver white.)**

- No. 30. AXOTOMOUS ARSENIC PYRITES.  
(*Jameson.*)  
ARSENIKKIES. AXOTOMER.  
(*Mohs.*)  
FER ARSENICAL. (*Haüy.*)  
*from Reichenstein in Illesia,*

**(Gold yellow.)**

- No. 31. HEXAHEDRAL GOLD. (*Hy.*)  
GEDIEGEN GOLD. (*Werner.*)  
OR NATIF. (*Haüy.*)  
*from Veraspatak, Hungary.*

**(Tin white.)**

- No. 32. HEXAHEDRAL COBALT PY-  
RITES.  
GLANZKOBALT. (*Werner.*)  
COBALTE GRIS. (*Haüy.*)  
*from Tunaberg in Sweden.*

**(Lead gray.)**

- No. 33. SULPHURET OF MOLYBDENA.  
(*Jameson.*)  
MOLYBDAENGLANZ. WASSER-  
BLEI. (*Werner.*)  
MOLYBDENE SULFURE. (*Haüy.*)  
*from Altenberg in Saxony.*

**(Lead gray inclining to redish.)**

- No. 34. GALENA. (*Phill.*)  
BLEIGLANZ. (*Werner.*)  
PLOMB SULFURE. (*Haüy.*)  
*from Neudorf, Harz.*

**(Steel gray.)**

- No. 35. NATIVE PLATINA. (*Jameson.*)  
GEDIEGEN PLATIN. (*Werner.*)  
PLATINE NATIF. (*Haüy.*)  
*from Tagilsk in the Ural.*

Nos. 36 to 111.

**NON-METALLIC COLOURS.****(Snow white.)**

- No. 36. (ARRAGONITE.)  
EISENBLUTHE. (*Werner.*)  
FLOS FERRI.  
*from Eisenerz in Steyermark.*

**(Yellowish white.)**

- No. 37. STALACTITE.  
KALKSINTER.  
TROPFSTEIN.  
*from Unkel near Bonn.*

**(Grayish white.)**

- No. 38. GRANULAR LIMESTONE.  
KORNIGER KALK.  
CALCAIRE SACCHAROIDE.  
*from Auerbach on the Bergstrasse.*

**(Greenish white.)**

- No. 39. FLUOR-SPAR.  
FLUSSPATH.  
CHAUX FLUATÉE.  
*from Freiberg, Saxony.*

**(Milky white.)**

- No. 40. COMMON-OPAL.  
GEMEINER OPAL. (*Werner*).  
QUARZ RESINITE COMMUN.  
*from Baumgarten in Silesia.*

**(Bluish gray.)**

- No. 41. COMMON CALCEDONY.  
CALZEDON.  
CALCEDOINE.  
*from Oberstein.*

**(Pearly gray.)**

- No. 42. COMMON QUARTZ.  
GEMEINER QUARZ.  
*from Tunaberg.*

**(Smoke gray.)**

- No. 43. FLINT.  
FEUERSTEIN.  
SILEX PYROMAQUE.  
*from Schen.*

**(Greenish gray.)**

- No. 44. WHETSTONE-SLATE.  
WETZ SCHIEFER.  
SCHISTE COTICULE.  
*from Sciffersdorf near Freiberg.*

**(Yellowish gray.)**

- No. 45. FLINT.  
FEUERSTEIN.  
SILEX PYROMAQUE.  
*from Rügen.*

**(Ash gray.)**

- No. 46. MOUNTAIN SOAP.  
BERGSEIFE.  
SAVON DE MONTAGNE.  
*from Kusterschütz in the Mittelgebirge.*

**(Ash gray.)**

- No. 47. ZOISITE. (*Jameson*).  
ZOISIT. (*Werner*).  
EPIDOTE. (*Hauy*).  
*from Gefrees in Bavaria.*

**(Grayish black.)**

- No. 48. BASALTE.  
BASALT.  
*from Linz, Rhine.*

**(Velvet black.)**

- No. 49. OBSSIDIAN. (*Werner*).  
OBSSIDIENNE.  
*from the Lipari Islands.*

**(Greenish black.)**

- No. 50. HORNBLende. (*Werner*).  
AMPHIBOLE. (*Häuy*).  
*from Pargas Finnland.*

**(Greenish black.)**

- No. 51. HORNBLende. (*Werner*).  
AMPHIBOLR. (*Häuy*).  
*from Arendal, Norway.*

**(Brownish black.)**

- No. 52. BROWN-COAL. (*Jameson*).  
BRAUNKOHLR. (*Werner*).  
HOUILLE BRUN. (*Häuy*).  
*from Töplitz.*

**(Brownish black.)**

- No. 53. MICA.  
MUSCOVITE. (*Dana*).  
ZWEIAXIGER GLIMMER.  
*from Miask in the Ural.*

**(Bluish black.)**

- No. 54. OXIDE OF COBALT.  
ERDKOBALT.  
COBALT OXYDE.  
*from Saalfeld in Thüringia.*

**(Azure blue.)**

- No. 55. BLUE COPPER ORE.  
KUPFERLASUR. (*Werner*).  
AZURITE. (*Beudant*).  
*from Moldawa, Bauat,*

**(Violet blue.)**

- No. 56. AMETHYST.  
AMETHYST.  
QUARZ HYALIN VIOLET.  
*from Oberstein.*

**(Lavender blue.)**

- No. 57. FERRUGINOUS LITHOMARGE.  
EISENSTEINMARK. (*Freiesleben*).  
*from Planitz near Zwickau.*

**(Prussian blue.)**

- No. 58. PRISMATIC KYANITE. (*Jameson*).  
KYANIT. (*Werner*). KYANIT.  
(*Breith*).  
DISTHENE. (*Häuy*).  
*from Greiner in the Tyrol.*

**(Smalte blue.)**

- No. 59. COMMON CALCEDONY.  
CALCEDON.  
CALCEDOINE.  
*from Trestyan, Transylvania.*

**(Smalte blue.)**

- No. 60. ANHYDRITE. (*Jameson*).  
ANHYDRIT DICHTER (*Werner*).  
CHAUX SULFATEE ANHYDRE  
(*Häuy*).  
*from Sulz, on the Neckar.*

**(Indigo blue.)**

- No. 61. EARTHY BLUE IRON (*Jameson*).  
BLAUEISENERDE (*Werner*).  
FER PHOSPHATE TERREUX  
(*Häuy*).

**(Indigo blue.)**

- No. 62. INDIGO COPPER.  
KUPFERINDIG. (*Breithaupt*).  
COVELLINE. (*Beudant*).  
*from Donzbach near Dillenburg in Nassau.*

**(Sky blue.)**

- No. 63. BLUE COPPER.  
KUPFERLASUR. (*Werner*).  
AZURITE. (*Beudant*).  
*from Rhein-breitbach.*

**(Verdigris green.)**

- No. 64. SILICO-CARBONATE OF COPPER  
(*Thomson*). On heavy spar.  
CHRYSOCOLLA. KIESELKUPFER.  
*from Salfeld, Thuringia.*

**(Celandrine green.)**

- No. 65. GREEN EARTH.  
GRUNERDE.  
TERRE VERTE.  
*from Monte Baldo near Verona.*

**(Mountain green.)**

- No. 66. NOBLE BERYL.  
EDLER BERYLL. (*Werner*).  
EMERAUDE. (*Jameson*).  
*from Nertschink, Siberia.*

**(Leek green.)**

- No. 67. PRASE. (*Jameson*).  
PRASEM. (*Werner*).  
QUANZ HYALIN VERT OBSCUR.  
(*Häuy*).  
*from Brietenbrann, Saxony.*

**(Emerald green.)**

- No. 68. FIBROUS MALACHITE.  
MALACHIT FASRIGER. (*Werner*).  
CUIVRE CARBONATE VERT  
SOYEUX. (*Häuy*).  
*from Katherinenburg in the Ural.*

**(Apple green.)**

- No. 69. CHRYSOPRASE.  
*from Frankenstein, in Silesia.*

**(Grass green.)**

- No. 70. GLASSY ACTINOLITE.  
GLASIGER STRAHLSTEIN.  
AMPHIBOLE VITREUX.  
*from Greiner in the Tyrol.*

**(Grass green.)**

- No. 71. GREEN PHOSPHATE OF LEAD.  
GRUNBLEIERZ (*Werner*).  
PLOMB PHOSPHATE VERT.  
(*Häuy*).

**(Pistachio green.)**

- No. 72. PRISMATOIDIAL AUGITE.  
(*Jameson*).  
PISTACIT (*Werner*).  
EPIDOTE (*Häuy*).  
*from Arendal, Norway.*

**(Asparagus green.)**

- No. 73. CONCHOIDAL APATITE. (*Jameson*).  
SPARGELSTEIN (*Werner*).  
CHAUX PHOSPHATEE (*Häuy*).  
*from Greiner in the Tyrol.*

**(Blackish green.)**

- No. 74. COCCOLITE. (*Jameson*).  
 KOKKOLITH. (*Werner*).  
 PYROXENE GRANULOK. *from Arendal in Norwegia.*

**(Oil green.)**

- No. 75. CHRYSOLITE (*Phillips*).  
 OLIVIN.  
 PERIDOT GRANULIFORME.  
 (*Häüy*). *from Dreis in the Eifel,*

**(Oil green.)**

- No. 76. PITCHSTONE.  
 PECHSTEIN.  
 PIERRE DE POIX.  
*from Buschbad near Meissen.*

**(Siskin green.)**

- No. 77. URANITE.  
 URAN GLIMMER.  
 KALKHALTIGER.  
*from Fohann Georgenstadt, Saxony.*

**(Sulphur yellow.)**

- No. 78. PRISMATIC SULPHUR.  
 SCHWEFEL, NATURLICHER.  
 SOUFRE (*Häüy*).  
*from Girgenti in Sicilia.*

**(Straw yellow.)**

- No. 79. SCHORLITE. (*Jameson*).  
 PIKNIT. (*Werner*).  
 PICENITE. (*Häüy*).  
*from Altenberg in Saxony.*

**(Wax yellow.)**

- No. 80. SULPHURET OF ZINC.  
 BLENDE.  
 ZINC SULFURE.  
*from Kapnik, Hungary.*

**(Honey yellow.)**

- No. 81. SEMI OPAL.  
 HALBOPAL.  
*from Libethen, Hungary.*

**(Honey yellow.)**

- No. 82. HONEYSTONE. (*Jameson*).  
 HONIGSTEIN. (*Werner*).  
 MELLITE. (*Häüy*).  
*from Artern in Thüringen.*

**(Lemon yellow.)**

- No. 83. PRISMATOIDAL SULPHUR.  
 (*Jameson*).  
 GELBERSKAUSCHGELB. (*Werner*).  
 ARSENIC SULFURE JAUNE.  
 (*Häüy*). *from Persia.*

**(Lemon yellow.)**

- No. 84. URAN-OGHRE. (*Jameson*).  
 URANOCKER. (*Werner*).  
*from Joachimsthal in Böhemia,*

**(Ochre yellow.)**

- No. 85. IRON-OGHRE.  
 EISENOCKER.  
 FER OXIDE TERREUX.  
*from Elba.*

**(Wine yellow.)**

- No. 86. PRISMATIC TOPAS. (*Jameson*).  
 TOPAS. (*Werner*).  
 ALUMINE FLUATÉE SILCEUSE.  
 (*Haüy*).  
*from the Schneckenstein in Saxony.*

**(Cream yellow.)**

- No. 87. MYELIN. (*Breith.*)  
 TALKSTEINMARK. (*Freissleben*).  
*from Rochlitz in Saxony.*

**(Orange yellow.)**

- No. 88. PYRAMIDAL LEAD-SPAR.  
 (*Jameson*).  
 GELBBLEIERZ. (*Werner*).  
 PLOMB MOLYBDATE. (*Haüy*).  
*from Bleiberg in Carinthia.*

**(Aurora red.)**

- No. 89. CHROMATE OF LEAD (*Phill.*).  
 ROTHBLEIERZ KALLOCHROM  
 (*Hausm.*)  
 PLOMB CHROMATE. (*Haüy*).  
*from Beresowsk in the Ural.*

**(Hyacinth red.)**

- No. 90. HYACINTH. (*Werner*).  
 HYACINTE.  
*from Ceylon.*

**(Brick red.)**

- No. 91. STILBITE. (*Haüy*).  
 FOLIATED ZEOLITE. (*Jameson*).  
 BLATTER-ZEOLITH. (*Werner*).  
*from Val di Fassa in the Tyrol.*

**(Scarlet red.)**

- No. 92. PRISMATIC RHOMBOIDAL RUBI-  
 BLENDE.  
 ZINNOBER (*Werner*).  
 MERCURE SULFURE (*Haüy*).  
*from Wolfstein, Rhinish Bavaria.*

**(Blood red.)**

- No. 93. PYROPE.  
 GRENAT ROUGE DU FEU.  
*from Meronitz in Bohemia.*

**(Flesh red.)**

- No. 94. PRISMATIC FELSPAR. (*Jameson*).  
 FELDSPATH. (*W.*) ORTHOK-  
 LAS. (*Breith.*)  
 ORTHOSE. (*Beud.*).  
*from Hirschberg in Silesia.*

**(Carmine red.)**

- No. 95. DODRAHEDRAL CORUNDUM.  
 (*Jameson*).  
 SPINEL. (*Werner*).  
 SPINELLE. (*Haüy*).  
*from Ceylon.*

**(Rose red.)**

- No. 96. ROSE QUARTZ.  
 ROSENQUANZ.  
 QUARZE ROSE.  
*from Rabenstein in Bavaria.*

**(Rose red.)**

- No. 97. NEEDLE ZEOLITE.  
 MESOTYPSPATH. Natrolith in  
 Klingstein.  
 ZEOLITE EN AIGUILLES.  
*from Aussig in Bohemia.*

**(Peach blossom red.)**

- No. 98. LEPIDOLITE, LITHIA MICA.  
LEPIDOLITH, LITHIONGLIM-  
MER.  
*from Rozena near Kradisks in Moravia.*

**(Peach blossom red.)**

- No. 99. RED COBALT OCHRE. (*Jameson*).  
KOBALTBESOCHLAG (*Werner*).  
COBALTE ARSENIATE PULVERU-  
LENT. (*Haüy*).  
*from Schneeberg.*

**(Columbine red.)**

- No. 100. PRECIOUS-GARNET ; IRON-  
GARNET (*Dana*).  
EDLER GARNAT.  
ALMANDINE (*Beudant*).  
*from Greenland.*

**(Cherry red.)**

- No. 101. PRISMATIC ANTIMONY-  
BLENDE, (*James*).  
ROTHSPIEGLASERZ (*Werner*).  
ANTIMOINE OXYDE SULFUR.  
(*Haüy*).  
*from Bräunsdorf near Freiberg.*

**(Brownish red.)**

- No. 102. FERRUGINOUS QUARTZ. (*Dana*).  
EISENKIESEL. (*Werner*).  
QUARTZ HYALIN HEMATOIDE ;  
SINOPLK.  
*from Schellerhau in Saxony.*

**(Reddish brown.)**

- No. 103. FERRUGINOUS QUARTZ (*Dana*).  
EISENKIESKL. (*Werner*).  
QUARTZ HYALIN HEMATOIDE ;  
SINOPLK.  
*from Schellerhau in Saxony.*

**(Clove brown.)**

- No. 104. SMOKY QUARTZ.  
RAUCH-QUARTZ ; BERGKRYS-  
TALL.  
QUARTZ HYALIN ENFUME.  
*from St. Gotthard.*

**(Hair brown.)**

- No. 105. YELLOW HYDRATED OXIDE OF  
IRON.  
GELBEISENSTEIN.  
FER OXYDE HYDRATE JAUNE.  
*from Klein Schmalkalden.*

**(Chestnut brown.)**

- No. 106. JASPER (*Jameson*)  
JASPIS (*Werner*)  
QUARTZ JASPE. (*Haüy*).  
*from Cairo.*

**(Yellowish brown.)**

- No. 107. HORNSTONE.  
HORNSTEIN.  
QUARTZ AGATE GROSSIER.  
*from Schneeberg Saxony.*



(Finchbeck brown.)

- No. 108. **HERMIPRISMATIC** SCHILLER-  
SPAR. (*Jam.*)  
**BLATTRIGER** ANTHOPHILIT.  
(*Werner*)  
**DIALLAG** METALLOIDE. BRON-  
ZIT. (*Haüy*).  
*from Kupferberg in Bavaria.*

(Wood brown.)

- No. 109. **ROCK-WOOD.**  
**BERGHOLZ.** (*Werner*).  
**BOIS DE MONTAGNE.**  
*from Sferzing in the Tyrol.*

(Liver brown.)

- No. 110. **SEMI OPAL.**  
**HALBOPAL.**  
*from Bilin in Böhemia.*

(Blackish brown.)

- No. 111. **BROWN-COAL.** (*Jameson*).  
**BRAUNKOHL.** (*Werner*).  
**HOUILLE BRUN.** (*Haüy*).  
*from Töplitz.*

Nos. 112 to 120.

**TARNISH. DICHROISM.**

*Under the term of Iridescence may be included a play or change of colours, opalescence, iridescence and tarnish, with other peculiarities often very remarkable and well distinguishing certain minerals.*

(Play of colour.)

- No. 112. **PRECIOUS OPAL.**  
**EDLER OPAL.**  
**QUARZ RESINITE OPALIN.**  
*from Czerwenitz in Hungary.*

(Play of colour.)

- No. 113. **LABRADOR FELSPAR.** (*Jameson*).  
**LABRADOR.** (*Werner*).  
**FELDSPATH OPALIN.** (*Haüy*).  
*from Labrador.*

(Opalescence.)

- No. 114. **COMMON-OPAL.**  
**GEMEINER OPAL.** (*Werner*).  
**QUARZ RESINITE COMMUN.**  
*from Baumgarten in Silesia.*

(Iridescence.)

- No. 115. **AVANTURINE FELSPATHIC.**  
**SUNSTONE FELSHATHIC SON-**  
**NENSTEIN.**  
*from Tvedestrand in Norway.*

(Painted.)

- No. 116. **ARRAGONITE.**  
**SPRUDELSTEIN.**  
**CHAUX CONCRETIONEE.**  
*from (Carlsbad).*

(With veins.)

No. 117. COMMON SERPENTINE.  
SERPENTIN.  
OPHIOLITE.  
*from Zöblitz in Saxony.*

---

*Polychroism is a property belonging to some prismatic crystals, presenting a different colour in different directions. The term dichroism is sometimes used, the colours occurring only in two directions, as in Iolite, hence called Dichroite.*

---

(Dichroism.)

No. 118. PRISMATOIDIAL AUGITE.  
(Jameson).  
PISTACIT. (Werner).  
EPIDOTE (Hay).  
*from Dauphine.*

(Dichroism.)

No. 119. IOLITE.  
CORDIERITE.  
DICHROITE.  
*from Haddan, Connecticut.*

(Dichroism.)

No. 120. TOURMALINE.  
EDLER TURMALIN.  
TOURMALINE.  
*from St. Pietro, in Elba.*

## MINERALS

TO ILLUSTRATE

## DIAPHANEITY, REFRACTION AND PHOSPHORESCENCE.

TRANSPARENCY is the property which many substances possess of transmitting light, and such are termed transparent ; semi-transparent ; translucent ; sub-translucent and opaque, according to the quantity of light transmitted.

Nos. 1 to 8.

## DIAPHANEITY.

(Transparent.)

- No. 1. AXIFRANGIBLE GYPSUM.  
(James.)  
FRAUENEIS. (Gyps). (Werner).  
CHAUX SULFATEE. (Hy).  
from Eisleben.

(Transparent.)

- No. 2. ROCK-CRYSTAL. (Jameson).  
BERGKRISTALL.  
QUARZ-HYALIN. (Hauy).  
from St. Gotthardt.

(Translucent.)

- No. 3. COMMON QUARTZ.  
GEMEINER QUARZ.  
from Freiberg, Saxony.

(Translucent.)

- No. 4. CALCITE. (Dana); CALCAREOUS  
SPAR.  
KALKSPATH.  
CHAUX CARBONATEE.  
from Andreasberg in the Hartz.

(Translucent.)

- No. 5. ROSE QUARTZ.  
ROSENQUARZ.  
QUARZ ROSE.  
from Rabenstein in Bavaria.

(Semi-translucent.)

- No. 6. ALABASTER  
GESSO. KORNIGER GYPS.  
ALABATRE.  
from Castellina in Tuscany.

(Semi-translucent.)

- No. 7. SEMI OPAL.  
HALBOPAL.  
from Libellthen, Hungary.

**(Semi-transparent.)**

- No. 8. FLINT.  
 FUERSTEIN.  
 SILEX PYROMAQUE.  
*from Reigen.*

---

Nos. 9 to 24.

**REFRACTION.**

A ray of light proceeding from any object and passing from any one medium or transparent substance to another is more or less bent out of its original direction and this bending is called refraction. But when a ray of light passes through certain minerals it is separated into two parts, each part undergoing a different refraction and ultimately emerging by itself. An object seen through such a mineral is seen double, and the phenomena is called double refraction.

**(Refractive and polarising.)**

- No. 9. DOUBLE REFRACTING SPAR.  
 DOPPELSPATH.  
 CHAUX CARBONATEE.  
*from the Eastern Coast Islands.*

**(Refractive.)**

- No. 10. ARRAGONITE.  
 ARRAGONIT. (*Hg.*)  
*from Bilin in Böhemia.*

**(Refractive.)**

- No. 11. ROCK CRYSTAL. (*Jameson*).  
 BERGKRISTALL.  
 QUARZ-HYALIN. (*Häuy*).  
*from St. Gotthardt.*

**(Refractive.)**

- No. 12. NOBLE BERYL.  
 EDLER BERYLL. (*Werner*).  
 EMERAUDE. (*Jameson*).  
*from Nertschink, Siberia.*

**(Refractive.)**

- No. 13. PRISMATIC TOPAS.  
 TOPAS. (*Werner*).  
 ALUMINE FLUATE SILICENSE.  
*from Villa Rica in Brasil.*

**(Refractive.)**

- No. 14. FLUOR-SPAR.  
 FLUSSPATH.  
 CHAUX FLUATEE.  
*from Bear Ashton, Devonshire.*

**(Refractive.)**

- No. 15. PRISMATIC FELS-SPAR. (*Jameson*).  
 ADULAR. (*Werner*).  
 FELDSPATH. (*Häuy*).  
*from St. Gotthardt.*

**(Refractive.)**

- No. 16. DIOPSIDE.  
 DIOPSID.  
*from Rothenkopf, Tyrol.*

**(Tarnished by passing in brown Iron ore.)**

- No. 17. IRON GLANCE.  
 EISENGLANZ.  
 FER OLIGISTE.  
*from Rio, Elba.*

(Tarnished.)

- No. 18. IRON GLANCE.  
EISENGLANZ.  
FER OLIGISTE.  
*from Rio, Elba.*

(Tarnished.)

- No. 19. HEXAHEDRAL IRON-PYRITES.  
(Jameson).  
SCHWEFELKIES. (Werner).  
FER SULFURE. (Haüy).  
*from Santa fe de Bogota.*

(Tarnished.)

- No. 20. OCTAHEDRAL BISMUTH.  
(James).  
GEDIEGEN WISMUTH. (Werner).  
BISMUTH NATIF. (Haüy).  
*from Schneeberg, Saxony.*

(Tarnished.)

- No. 21. NATIVE ARSENIC.  
GEDIEGEN ARSENIK. (Werner).  
ARSENIC NATIF. (Haüy).  
*from Andreasberg in the Harz.*

(Tarnished.)

- No. 22. VARIEGATED COPPER.  
BUNTKUPFERERZ. (Werner).  
CUIVRE PYRITEUX HEPATHIQUE. (Haüy).  
*from Lauterberg in the Harz,*

(Tarnished.)

- No. 23. ALLOPHANE.  
ALLOPHAN (STROMEIER).  
*from Saalfeld, Thuringia.*

(Tarnished.)

- No. 24. FOLIATED COAL.  
BLATTERKOHLE.  
HOUILLE FEULLETE.  
*from Waldenburg Silesia.*

Nos. 25 to 30.

## PHOSPHORESCENCE.

*The property of remitting light, either by friction or when gently heated, is called phosphorescence and is possessed by several minerals.*

(Evolving light by friction.)

- No. 25. COMMON QUARTZ.  
GEMEINER QUARZ.  
*from Freiberg, Saxony.*

(Phosphorescent by friction.)

- No. 26. SULPHURET OF ZINC.  
BLENDE.  
ZINC SULFURE.  
*from Kaprik, Hungary.*

(Phosphorescent by friction.)

- No. 27. AMPHIBOLE FIBREUX.  
TREMOLITH. (Werner).  
*from St. Gothard.*

(Phosphorescent by means of heat.) (Phosphorescent by means of heat.)

No. 28. FLUOR SPAR.  
FLUSSPATH.  
CHAUX FLUATEE.  
*from Tavistock, Devonshire.*

No. 30. PREDAZZIT. (*Petzhold*).  
*from Predazzo in the Tyrol.*

#### INSTRUMENTS.

(Phosphorescent by means of heat.)

No. 29. PHOSPHATE OF LIME.  
PHOSPHORIT. (*Werner*).  
CHAUX PHOSPHATE.  
*from Logrosan in Estremadura.*

A delicate Electroscope.  
A delicate Magnetoscope.  
Senarmonts apparatus and crystals to illustrate the thermotic characters of minerals.

# MINERALS

TO ILLUSTRATE  
TASTE AND ODOUR.

---

Nos. 1 to 7.

## TASTE.

---

(Alkaline taste.)

No. 1. CARBONATE OF SODA.  
*from Chile.*

No. 2. OCTAHEDRAL SALT-AMMONIAC.  
(*Jam.*)  
SALMIAC. (*Werner*).  
AMMONIAQUE MURIATEE.  
(*Häuy*).  
*from Vesuvius (Eruption of 1834.)*

(Saline taste.)

No. 3. ROCK-SALT.  
STEINSALZ. (*Werner*).  
SOUDE MURIATE.  
*from Hall in Württenberge.*

(Cooling.)

No. 4. NATRON. SALTPETRE.  
SOUDE NITRATE. (*Häuy*).  
*from Chile.*

(Sweetish astringent.)

No. 5. ALUNOGENE. (*Beudant*).  
KERAMOHALIT. (*Glocker*).  
*from Schemnitz.*

(Metallic astringent.)

No. 6. RHOMBODAL VITRIOL. (*Jam*).  
FER SULFATE. (*Häuy*).  
EISENVITRIOL. (*Werner*).  
*from Rammelsberg near Goslar in the Hartz.*

(Bitter saline taste.)

No. 7. EPSOM SALT.  
*from Idria.*

Nos. 8 to 20.

## ODOUR.

---

(Bituminous odour.)

No. 8. ASPHALT.  
BITUME SOLIDE.  
*from Limmer near Hanover.*

(Sulphureous odour.)

No. 9. PRISMATIC SULPHUR.  
SCHWEFELD, NATURLICHER.  
SOUFRE.  
*from Wenzel, Hanover.*

(Argillaceous odour.)

No. 10. CLAY.  
*from Lenz near Bonn on the Rhine*

**(Argillaceous odour.)**

- No. 11. **TEACHYTE.**  
*from Berkum near Bonn.*

**(Argillaceous odour.)**

- No. 12. **MICA.**  
**GLIMMER.** (*Werner*). **ZWEI-  
AXIGER.**  
*from Zinnwald in Bohemia.*

**(Bitter Argillaceous odour.)**

- No. 13. **PIKROSMINE.**  
**PIKROSMIN.** (*Heidinger*).  
*from Zöblitz in Saxony.*

**Fetid bituminous (by friction.)**

- No. 14. **ANTHRACONITE.**  
*from Andarum, Schönen.*

**Fetid bituminous (by friction.)**

- No. 15. **ANTHRACONITE.** (*Lucullan*).  
*from Sundaland.*

**Fetid bituminous (by friction.)**

- No. 16. **HEPATIT.** (Sulphate of Barytes.)  
*from Andrarum, (Schönen.)*

**Sulphureous odour (by friction.)**

- No. 17. **PYRITES.**  
**SCHWEFELKIES.**  
**FER SULFURE.** (*Hauy*).  
*from Marienberg near Bonn.*

**Alliaceous odour (by friction.)**

- No. 18. **PRISMATIC ARSENICAL PY-  
RITES.** (*Jameson*).  
**ARSENIKKIES.** (*Werner*).  
**FER ARSENICAL.** (*Hauy*).  
*from Freiberg.*

**(Aromatic odour.)**

- No. 19. **OZOKERITE.**  
**ERDWACHS.**  
**OZOKERIT.** (*Glocker*).

**(Horseradish odour.)**

- No. 20. **SELENIURET OF LEAD.**  
**SELENBLI. CLAUSTHALIT.**  
(*Haid*).  
**SELENIURE DE PLOMB.**  
*from Tilkerode in the Harz.*



## MINERALS

TO ILLUSTRATE

## ELECTRICITY AND MAGNETISM.

No. 1 to 28 becoming + electr. by friction. No. 33 to 38 electr. by heat.  
 No. 29 to 32 becoming — electr. by friction. No. 39 to 50 Magnetism.

Becoming + electr. by friction, viz.

No. 1 to 28—Becoming positive electric, by friction.

No. 1. HEXAHEDRAL ROCK-SALT.  
*(Jam).*  
 STEINSALZ.  
 SOUDE MURIATEE. (*Haüy*).  
*from Wieliczka.*

No. 2. GYPSUM.  
 GYPS.  
 CHAUX SULFATÉE.  
*from Montmartre, near Paris.*

No. 3. ANHYDRITE. (*Jameson*).  
 ANHYDRIT DICHTER. (*Werner*).  
 CHAUX SULFATÉE ANHYDRE.  
 (*Haüy*).  
*from Sulz a Neckar.*

No. 4. FLUOR-SPAR.  
 FLUSSSPATH.  
 CHAUX FLUATÉE.  
*from Derbyshire.*

No. 5. ARRAGONITE.  
 ARRAGONIT. (*Haüy*).  
*from Bilin in Bohemia.*

No. 6. CARBONATE OF LIME. (*Phill.*).  
 KALSPATH-CALCIT. (*Haid.*).  
 CHAUX CARBONATÉE. (*Haüy*).  
*from Auerbach-Saxony.*

No. 7. MISMITE.  
*from Tuscany.*

No. 8. CARBONATE OF STRONTIAN.  
 STRONTIANIT.  
 STRONTIANE CARBONATÉE.  
*from Hamm in Westphalia.*

No. 9. CARBONATE OF BARYTES.  
 WITHERIT (*Werner*).  
 BARYTE CARBONATÉE. (*Haüy*).  
*from Alston in Cumberland.*

- No. 10. HEAVY SPAR ; BARYTES.  
SCHWERSPATH ; BARYTE.  
BARYTE SULFATEE,  
*from Freiberg in Saxony.*
- No. 11. CELESTINE.  
COELESTIN. (*Werner*).  
STRONTIANE SULFATEE.  
*from Strontian.*
- No. 12. CARBONATE OF LEAD.  
WEISSBLEIERZ.  
PLOMB CARBONATE.  
*from the Grabe Kurfürst Ernst of  
Boenkhausen near Arensburg.*
- No. 13. CALAMINE.  
GALMEI. ZINKSPATH.  
ZINC CARBONATE (*Haüy*).  
*from Dagdnadzka, Banat.*
- No. 14. MICA.  
ZWEIAXIGER GLIMMER.  
MUSCOVITE. (*Dana*).  
*from Miask in the Ural.*
- No. 15. PRISMATIC KYANITE. (*Jameson*).  
ZYANIT. (*Werner*). KYANIT  
(*Breith.*).  
DISTHENE. (*Haüy*).  
*from Greiner in the Tyrol.*
- No. 16. STILBITE. (*Dana*).  
DESMIN. (*Breithaupt*) ; STRAHL-  
ZEOLITH.  
STILBIT. (*Haüy*) PARTIM.  
*from Farøe.*
- No. 17. AXIFRANGIBLE ZEOLITE.  
(*Jameson*).  
ICHTHIOPHTHALM (*Werner*).  
APOPHILLITE. (*Haüy*).  
*from the Seisser-Alp in the Tyrol.*
- No. 18. HEXAHEDRAL ZEOLITE. (*Jameson*).  
ANALZIM. (*Werner*).  
ANALCIME. (*Haüy*).  
*from the Seisser-Alp in the Tyrol.*
- No. 19. ELEOLITH.  
PIERRE GRASSE.  
*from Brenig in Norway.*
- No. 20. PRISMATIC FELSPAR, (*Jameson*).  
ADULAR. (*Werner*).  
FELDSPATHE. (*Haüy*).  
*from St. Gotthardt.*
- No. 21. BASALTIC HORNBLENDE.  
BASALTISCHE HORNBLENDE  
(*Werner*).  
AMPHIBOLE BASALTIQUE.  
*from Schima in Bohemia.*
- No. 22. AUGITE. (*Jameson*).  
GRÜNER AUGIT. (*Werner*).  
PYROXENE (*Haüy*).  
*from Schima in Bohemia.*
- No. 23. EPIDOTE (*Haüy*).  
PISTACIT. THALLIT. (*Hausm.*).  
*from Arendal in Norway.*

No. 24. BLUE SPINELL.  
BLAUER SPINELL.  
SPINELLE BLUE.  
*from Aoker in Sweden.*

No. 25. IOLITE.  
CARDIERITE.  
DICHROIT. STEINHEILIT, PELIOM.  
*from Orijarfvi Einnland.*

No. 26. ROCK CRYSTAL.  
BERGKRISTALL.  
QUARZ HYALIN.  
*from Jarischau in Silesia.*

No. 27. EGERANE. (VAR: from Vesuvius.)  
EGERAN (Werner).  
*from Haslan near Eger in Bohemia.*

No. 28. PRECIOUS GARNET; IRON-GARNET (Dana).  
EDLER GRANAT.  
ALAMANDINE (Beudant).  
*from Greenland.*

### MINERALS NEGATIVE ELECTRIC BY FRICTION.

(Negative electric by friction.)

No. 29. PRISMATIC SULPHUR.  
SCHWEFELD, NATURLICHER,  
SOUFRE. (Haüy).  
*from Girgenti in Sicily.*

(Negative electric by friction.)

No. 30. SCHLAGGY MINERAL PITCH.  
(Jameson).  
SCHLACKIGES ERDPECH. (Werner).  
BITUME SOLIDE. (Haüy).  
*from Asphalte lake.*

(Negative electric by friction.)

No. 31. YELLOW MINERAL-RESIN  
(Jameson).  
BERNSTEIN. (Werner).  
SUCCIN. (Haüy).  
*from the shores of the Indian Ocean.*

(Negative electric by friction.)

No. 32. HONEYSTONE. (Jameson).  
HONIGSTEIN. (Werner).  
MELLITE. (Haüy).  
*from Artern in Thuringia.*

(Positive electric by compression.)

No. 33. DOUBLE REFRACTING SPAR.  
DÖPPELSPATH.  
CHAUX CARBONATE.  
*from the Island of the Eastern Coast*

(Polar electric by heat.)

No. 34. RHOMBOIDAL TOURMALINE.  
(Werner).  
SCHORL, TURMALIN. (Werner).  
TOURMALINE. (Haüy).  
*from Elba.*

**(Polar electric by heat.)**

- No. 35. TOURMALINE.  
EDLER TURMALIN.  
TURMALINE.  
*from St. Pietro and Elba.*

**(Polar electric by heat.)**

- No. 36. BORATE OF MAGNESIA.  
BORACIT.  
MAGNESIE BORATEE. (*Häuy*).  
*from Kalkberg near Lüneburg.*

**(Polar electric by heat.)**

- No. 37. PRISMATIC TOPAS.  
TOPAS. (*Werner*).  
ALUMINE FLUATÉE SILICEUSE.  
*from Villa Rica in Brasil.*

**(Polar electric by heat.)**

- No. 38. ELECTRIC CALAMINE. (*Dana*).  
KIESELGALMEI. (*V. Kob*);  
ZINKGLAS. (*Hausm*).  
ZINC SILICATE. (*Dufrénoy*).  
*from Altenberg near Aachen.*

**(Magnetic minerals.)**

- No. 39. NATIVE LOADSTONE.  
ATTRACTORISCHES MAGNETEISEN.  
FER OXYDULE. (*Häuy*).  
*from Monte Calamita, Elba.*

**(Attracts.)**

- No. 40. MAGNETIC IRON ORE.  
MAGNETEISEN; MAGNETIT.  
(*Haid.*)  
FER OXYDULK. (*Häuy*); AIM-  
ANT. (*Beud.*).  
*from Arendal in Norway.*

**(Attracts.)**

- No. 41. MAGNETIC IRON ORE.  
MAGNETEISEN (*Werner*);  
MAGNETIT. (*Haid.*)  
FER OXYDULK. (*Häuy*); AIM-  
ANT. (*Beud.*).  
*from Philippstadt in Sweden.*

**(Attracts.)**

- No. 42. RHOMBOIDAL IRON-ORE.  
(*Jameson*).  
MAGNETEISENSTEIN. (*Werner*).  
FER OLIGISTE. (*Häuy*).  
*from Breitenbrunn in Saxony.*

**(Attracts.)**

- No. 43. MAGNETIC IRON.  
MAGNETEISEN. (*Werner*).  
FER OXYDULE.  
*from Greinsee in the Tyrol.*

- No. 44. CHROMIC IRON. (*Dana*).  
CHROMEISENSTEIN; CHROMIT.  
(*Haid.*)  
SIDEROCHROME. (*Beudant*).  
*from Grächen, Silesia.*

- No. 45. TITANIFEROUS IRON, in Basalt.  
TITANEISEN in Basalt.  
TITANATE DE FER in Basalt.  
*from Unkel on the Rhine.*

No. 46. TITANIFEROUS IRON.  
TITANEISENERZ.  
FER TITANE.  
*from Egersund, Norway.*

No. 47. ISERINE.  
*from Riesengeberge.*

No. 48. FRANKLINITE.  
*from Sparta in New-Jersey.*

No. 49. MAGNETIC PYRITES, (*Jameson.*)  
MAGNETKIES.  
FER SULFURE.  
*from Bodenmais in Bavaria.*

No. 50. IRON GLANCE.  
EISENGLANZ.  
FER OLIGISTE.  
*from Rio, Elba.*

---



## **B. CHEMICAL CHARACTERS OF MINERALS.**





## MINERALS

TO ILLUSTRATE

## KOBELL'S SCALE OF FUSIBILITY.

- 
- |   |  |
|---|--|
| <p>No. 1. PRISMATIC FELSPAR. (<i>Jameson</i>).<br/>ADULAR. (<i>Werner</i>).<br/>FELDSPATH. (<i>Haüy</i>).<br/><i>from St. Gothardt, Switzerland.</i></p>  | <p>No. 4. PRECIOUS GARNET; IRON-<br/>GARNET. (<i>Dana</i>).<br/>EDLER GRANAT.<br/>ALAMANDINE. (<i>Beudant</i>).<br/><i>from Greenland.</i></p> |
| <p>No. 2. GRAY ANTIMONY ORE.<br/>ANTIMONGLANZ.<br/>ANTIMOINE SULFURE<br/><i>from the Caspari Zeche near Arensburg.</i></p>  | <p>No. 5. GLASSY ACTINOLITE.<br/>GLASIGER STRAHLSTEIN.<br/>AMPHIBOLE VITREUX.<br/><i>from Greiner in the Tyrol.</i></p>                        |
| <p>No. 3. HEMIPRISMATIC SCHILLER-<br/>SPAR. (<i>Jam.</i>)<br/>BLATTRIGER ANTHOPHILIT.<br/>(<i>Werner</i>).<br/>DIALLAG METALLOIDE. BRON-<br/>ZIT. (<i>Haüy</i>).<br/><i>from Kupferberg in Bavaria.</i></p> | <p>No. 6. NEEDLE ZEOLITE.<br/>MESOTYPSPATH. NATROLITH<br/>in Klingstein.<br/>ZEOLITE EN AIGUILLES.<br/><i>from Aussig in Bohemia.</i></p>      |
-



**C A T A L O G U E**  
OF THE  
**GOVERNMENT CENTRAL MUSEUM,**  
**M A D R A S.**

---

**ARRANGED AND COMPILED**

**BY**

**EDWARD BALFOUR, Esq., SURGEON, MADRAS ARMY,**

**OFFICER IN CHARGE.**

---

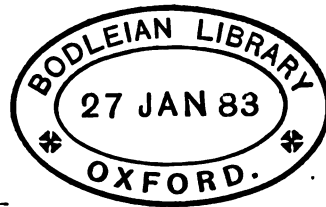
**B. PALAEONTOLOGY--Part II.**

---

**BY ORDER OF THE GOVERNMENT**

**OF**

**M A D R A S.**



---

**MADRAS :**

**Printed at the Military Male Orphan Asylum Press, Mount Road.**

---

**1855.**

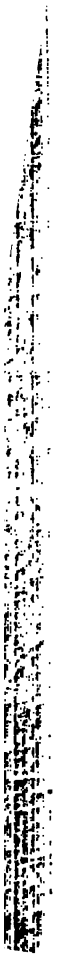
114 113 6



I am indebted to Professor MORRIS, Professor of Geology University of London, for the greatest part of these specimens.



**PALÆONTOLOGY** gives us an account of the remains of organic bodies, contained in, and associated with the inorganic materials of which the surface of the earth is composed, and it is of such organic remains as are in the Museum and of the rocks in which they are found that I have endeavoured, in the following pages, to construct a catalogue. In making this catalogue of the Aqueous Rocks and of the animal and vegetable remains which are found in them, the whole have been arranged Chronologically with reference to the successive geological periods when they originated. These remains are termed fossils by which is meant a body, or the traces of the existence of any body, whether animal or vegetable, which has been buried in the earth by natural causes. It is in the Aqueous Rocks that fossils chiefly occur for which reason this class of rocks are often called fossiliferous though the term sedimentary is likewise given from the circumstance of their having been deposited from water. These rocks are stratified or divided into distinct layers or strata, for *stratum* simply means a bed or any thing spread out or *strewed* over a given surface. Looking to the whole history of former life it is now almost every where acknowledged that during the formation of the sediments which compose the crust of the earth, the mineral kingdom has been at least three times entirely renovated. This has led to the whole of these strata being grouped into three great classes called the primary, secondary and tertiary, representing three periods of time, the secondary and tertiary periods being each as clearly characterised by a distinct fauna as the primeval series. Under this view the number of classes into which the fossiliferous strata may be separated are three,—but the groups may be more or less numerous according to the views of classification which different geologists entertain. The German, French and English geologists, however, who have determined the succession of strata throughout the greater part of Europe have pretty generally adopted the following arrangement of the groups of the fossiliferous strata which have been observed in Western Europe and almost all of which have their representatives in the British Isles.





**TABLE I.**

*Showing the Nineteen Subordinate Groups of Fossiliferous Strata observed in Western Europe, arranged under three principal Sections in what is termed a descending Series or beginning with the newest.*

Tertiary, Supracretaceous*, or Cainozoic.†		Secondary or Mesozoic.‡	Primary fossiliferous, or paleozoic.†
1 Post Pliocene, including those of the Recent, or human period.	6 Chalk.	14 Permian.	
2 Newer Pliocene, or Pleistocene.	7 Greensand.	15 Coal.	
3 Older Pliocene.	8 Wealden.	16 Old Red Sandstone or Devonian.	
4 Miocene.	9 Upper Oolite.	17 Upper Silurian.	
5 Eocene.	10 Middle Oolite.	18 Lower Silurian.	
	11 Lower Oolite.	19 Cambrian and older fossiliferous strata.	
	12 Lias.		
	13 Trias.		

It is not pretended that the three principal sections in the above table, No. I, called primary, secondary, and tertiary, are of equivalent importance or that the nineteen subordinate groups comprise monuments relating to equal portions of past time or of the earth's history. But it can be asserted that they each relate to successive periods during which certain animals and plants, for the most part peculiar to their respective eras, have flourished, and during which different kinds of sediment have been deposited in the space now occupied by Europe. If disposed on palæontological grounds‡ to divide the entire fossiliferous series into a few groups less numerous than those in the above table, and more nearly co-ordinate in value than the sections called primary, secondary and tertiary, SIR CHARLES LYELL considers that the six groups or periods given in the next table might be adopted.

**TABLE II.**

*Showing the Fossiliferous Strata of Western Europe divided into six Sections.*

- 1 Post Pliocene and Tertiary...from the Post Pliocene to the Eocene inclusive.
- 2 Cretaceous.....from the Maestricht chalk to the Lower Greensand inclusive.
- 3 Oolitic.....from the Wealden to the Lias inclusive.
- 4 Triassic.....including the Keuper, Muschelkalk, and Bunter Sandstein of the Germans.
- 5 Permian, Carboniferous, and Devonian.....including Magnesian Limestone (Zechstein,) Coal, Mountain Limestone and Old Red sandstone.
- 6 Silurian and Cambrian... ..from the Upper Silurian to the oldest fossiliferous rocks inclusive.

\* For tertiary Sir H. De la Beche has used the term Supracretaceous, a name implying that the strata so called are superior in position to the chalk.

† Professor Phillips has adopted these terms, Cainozoic, from *Cainos*, recent, and *Zoon*, animal. Mesozoic, from *mesos*, middle &c; paleozoic, from *palaios*, ancient, &c.

‡ Palæontology is the science which treats of fossil remains both animal and vegetable. Its derivation being from *palaios*, ancient, *onta*, beings, and *logos*, a discourse.

**GLOSSARY OF TERMS, ADOPTED INTO GEOLOGY FROM THE LATIN AND GREEK.**

- 1 **CAINOZIC**,.....from *cainos*, recent, and *zoon*, animal.
- 2 **CAMBRIAN**,.....is a geological name suggested by Professor Sedgwick to designate part of the Silurian series of North Wales.
- 3 **DEVONIAN**,.....because that class of rocks are greatly developed in Devonshire.
- 4 **Eocene**,..... from *eos*, dawn and *cainos*, recent, implying that these fossils and rocks mark the dawn or commencement of the life in the Tertiary period.
- 5 **Lias**,.....A provincial appellation, now generally adopted to designate the clayey limestone occurring between the upper new red sandstone and the oolite.
- 6 **MIOCENE**.....from *meion*, less, and *cainos*, recent, implying that they are less recent than the Eocene.
- 7 **OOLITE**,.....from *oolos*, egg, a limestone composed of rounded particles like the roe of a fish.
- 8 **PALÆOZOIC**,.....from *palaïos*, ancient, and *zoon*, life, implying those animals and vegetables that were most remotely formed.
- 9 **PERMIAN**,.....because this class of rocks are greatly developed in the Russian territory of Perm.
- 10 **POST**,.....after or subsequent to,—
- 11 **PLIOCENE**,..... from *pleion*, more, and *cainos*, recent.
- 12 **PRIMARY**,.....from *primus*, first, implying that this class comprise the primeval formed rocks.
- 13 **SECONDARY**,.....from *secundus*, second, implying second formed.
- 14 **SILURIAN**,.....because these rocks were first examined in a part of Britain wherein an ancient people, termed the Silures, had opposed a valorous resistance to the Romans.
- 15 **SUPRACRETACEOUS**.from *supra*, above, and *creta*, chalk.
- 16 **TERTIARY**,.....from *tertius*, third, because third formed.
- 17 **TRIAS**,.....the name given on the continent to the beds of new red sandstone.
- 18 **WEALDEN**,.....from the circumstance that these rocks occur in the Weald of Sussex.

---



## INDEX.

I. POST TERTIARY.		No. of the Specimen.	Page.	D. Eocene Group.	No. of the Specimen.	Page.
A. Post Pliocene Group.				6. UPPER EOCENE.		
Limestone Rock, newly formed by calcareous incrustations, &c.....	Post Pliocene	2	23	Cardita acuticosta.....	Upper Eocene	3 58
Limestone, conglomerate of comminuted shells, gravel, &c.....	Post Pliocene	1	23	Calyptrea Trochiforme ..	Upper Eocene	2 58
Limestone.....	Post Pliocene	3	23	Cassidulus ?.....	Upper Eocene	4 58
Sandstone fine, in process of formation, large nodular concretions.....	Post Pliocene	4	23	Cyrena obovata.....	Upper Eocene	2 24
Sandstone Rock, in process of formation, imbedding portions of porcelain, spices, &c.....	Post Pliocene	5	23	Cytherea incrassata.....	Upper Eocene	1 24
				Fusus bulbiformis.....	Upper Eocene	5 58
				Helix vectensis.....	Upper Eocene	6 58
				Hippotherium gracile.....	Upper Eocene	7 58
				Potamides cinctus.....	Upper Eocene	3 24
				Potamides concavus.....	Upper Eocene	4 24
				Tertiary limestone.....	Upper Eocene	1 58
				Venericardia planicosta..	Upper Eocene	5 24
II. TERTIARY				7. MIDDLE EOCENE.		
B. Pliocene Group.				ROCKS.		
3. NEWER PLIOCENE.				Grobkalk.....	Middle Eocene	7 25
Aporrhais Pes-pellicani ..	Newer Plio.	1	57	Grobkalk with Venus....	Middle Eocene	8 25
Astarte Borealis.....	Newer Plio.	2	57	Gyps jungerer.....	Middle Eocene	6 24
Nucula.....	Newer Plio.	3	57			
Nucula Portlandica ..	Newer Plio.	4	57	FOSSILS.		
Sanguinolaria Fusca ..	Newer Plio.	5	57	Actæon simulatus.....	Middle Eocene	8 58
Unio Pictorum, Mammalian				Anomia striata.....	Middle Eocene	9 59
Deposits.....	Newer Plio.	6	57	Balanus erisma.....	Middle Eocene	10 59
Venus Chione.....	Newer Plio.	7	57	Buccinum canaliculatum		
				(Fusus).....	Middle Eocene	11 59
				Bulimus ellipticus.....	Middle Eocene	12 59
				Calyptrea Trochiforme ..	Middle Eocene	13 59
				Cancellaria.....	Middle Eocene	16 59
				Cance tuberculatus.....	Middle Eocene	15 59
				Cardium semi-granulosum	Middle Eocene	17 59
				Cassidaria striata.....	Middle Eocene	22 59
				Cerithium cinctum.....	Middle Eocene	18 59
				Cerithium concavum.....	Middle Eocene	19 59
				Cerithium margaritaceum	Middle Eocene	20 59
				Chama squamosa.....	Middle Eocene	14 59
				Corbula longirostrum.....	Middle Eocene	21 59
				Crab.....	Middle Eocene	23 59
				Crab.....	Middle Eocene	25 59
				Crab.....	Middle Eocene	26 59
				Crab.....	Middle Eocene	27 59
				Crab.....	Middle Eocene	24 59
				Cyclotus cinctus.....	Middle Eocene	28 59
				Cyrena obovata.....	Middle Eocene	29 59
				Cytherea incrassata.....	Middle Eocene	30 59
				Euomphalus discus.....	Middle Eocene	31 59
				Freshwater limestone.....	Middle Eocene	32 59
				Fusus aciculatus.....	Middle Eocene	33 59
				Fusus labiatus.....	Middle Eocene	34 59
				Fusus longævus (vermilia crassa).....	Middle Eocene	35 59
				Fusus macilentus.....	Middle Eocene	36 59
				Fusus regularis.....	Middle Eocene	37 59
				Fusus rostratus.....	Middle Eocene	38 59
				Limnea globosula.....	Middle Eocene	39 59
C. Miocene Group.						
Cancellaria acutangula ? ..	Miocene	1	58			
Corbula rugosa.....	Miocene	1	24			
Cyrena suburata.....	Miocene	2	58			
Cytherea.....	Miocene	3	58			
Fusus Burdigalensis.....	Miocene	2	24			
Fusus Burdigalensis.....	Miocene	4	58			
Natica variabilis.....	Miocene	5	58			
Pecten.....	Miocene	4	24			
Pectunculus.....	Miocene	3	24			
Pectunculus.....	Miocene	6	58			
Spondylus.....	Miocene	7	58			
Strombus Italicus.....	Miocene	8	58			
Trochus magus.....	Miocene	5	24			
Turritella terebratis.....	Miocene	9	58			

MIDDLE EOCENE, continued.	No. of the Specimen.	Page.	LOWER EOCENE, continued.	No. of the Specimen.	Page.
<i>Limnea longiscata</i> .....	Middle Eocene	40 59	<i>Cerithium</i> .....	Lower Eocene	88 61
<i>Limnea pyramidalis</i> ....	Middle Eocene	41 59	<i>Chama squamosa</i> .....	Lower Eocene	15 25
<i>Melania lactea</i> .....	Middle Eocene	42 59	<i>Cordita globosa</i> .....	Lower Eocene	16 25
<i>Melanopsis carinatus</i> ....	Middle Eocene	43 59	<i>Cyrena cuneiformis</i> ....	Lower Eocene	89 61
<i>Melanopsis fusiformis</i> ....	Middle Eocene	44 59	<i>Fossil Resin</i> .....	Lower Eocene	90 61
<i>Natica mutabilis</i> .....	Middle Eocene	45 60	<i>Fusus</i> .....	Lower Eocene	91 61
<i>Nematura neritina</i> .....	Middle Eocene	47 60	<i>Fusus bulbiformis</i> ....	Lower Eocene	17 25
<i>Nematura pygmaea</i> .....	Middle Eocene	46 60	<i>Murex asper</i> .....	Lower Eocene	95 61
<i>Neritina concava</i> .....	Middle Eocene	48 60	<i>Melanopsis buccinoides</i> ..	Lower Eocene	93 61
<i>Nucula DesHayesii</i> .....	Middle Eocene	49 60	<i>Modiola elegans</i> .....	Lower Eocene	94 61
<i>Nummulites lavigata</i> ....	Middle Eocene	50 60	<i>Melania inquinata</i> ....	Lower Eocene	92 61
<i>Oliya Branderi</i> .....	Middle Eocene	53 60	<i>Nautilus centralis</i> .....	Lower Eocene	96 61
<i>Ostrea</i> .....	Middle Eocene	51 60	<i>Nautilus regalis</i> .....	Lower Eocene	97 61
<i>Ostrea callifera</i> .....	Middle Eocene	9 25	<i>Nucula amygdaloides</i> ....	Lower Eocene	18 25
<i>Ostrea tener</i> .....	Middle Eocene	52 60	<i>Nummulites</i> .....	Lower Eocene	33 26
<i>Paludina lenta</i> .....	Middle Eocene	54 60	<i>Nummulites</i> .....	Lower Eocene	34 26
<i>Paludina thermalis</i> .....	Middle Eocene	55 60	<i>Nummulites</i> .....	Lower Eocene	35 26
<i>Pholadomya margaritacea</i>	Middle Eocene	56 60	<i>Nummulites levigata</i> ....	Lower Eocene	98 61
<i>Planorbis euomphalus</i> ....	Middle Eocene	58 60	<i>Otodus obliquus</i> (tooth of)	Lower Eocene	99 61
<i>Planorbis rotundatus</i> ....	Middle Eocene	10 25	<i>Ostrea pulchra</i> .....	Lower Eocene	100 61
<i>Planorbis rotundatus</i> ....	Middle Eocene	59 60	<i>Pectunculus brevirostrum</i> ..	Lower Eocene	101 61
<i>Planorbis rotundatus</i> ....	Middle Eocene	60 60	<i>Pectunculus decussatus</i> ...	Lower Eocene	19 25
<i>Pleurotoma attenuata</i> ....	Middle Eocene	61 60	<i>Petrophylloides Richardsoni</i> .....	Lower Eocene	20 25
<i>Pleurotoma filosa</i> .....	Middle Eocene	62 60	<i>Petrophylloides Richardsoni</i> .....	Lower Eocene	102 61
<i>Potamides</i> .....	Middle Eocene	63 60	<i>Pinna affinis</i> .....	Lower Eocene	106 61
<i>Potamides mucicatus</i> ....	Middle Eocene	64 60	<i>Planorbis</i> .....	Lower Eocene	21 25
<i>Potamides ventricosus</i> ....	Middle Eocene	65 60	<i>Palaeophis tollapicus</i> ....	Lower Eocene	22 25
<i>Potamomya plana</i> .....	Middle Eocene	66 60	<i>Rostellaria macroptera</i> ...	Lower Eocene	103 61
<i>Psammobia compressa</i> ?	Middle Eocene	67 60	<i>Septarium</i> .....	Lower Eocene	25 25
<i>Psammobia rugosa</i> .....	Middle Eocene	68 66	<i>Septarium</i> .....	Lower Eocene	26 25
<i>Psammobia rudis</i> .....	Middle Eocene	69 60	<i>Septarium</i> .....	Lower Eocene	27 25
<i>Rostellaria fissinella</i> ....	Middle Eocene	70 60	<i>Septarium</i> .....	Lower Eocene	28 25
<i>Rostellaria rimosa</i> .....	Middle Eocene	71 60	<i>Septarium</i> .....	Lower Eocene	29 25
<i>Sanguinolaria hollowaysii</i>	Middle Eocene	72 60	<i>Septarium</i> .....	Lower Eocene	30 25
<i>Seraphs convolutus</i> .....	Middle Eocene	73 60	<i>Septarium</i> .....	Lower Eocene	31 26
<i>Silicious limestone</i> .....	Middle Eocene	11 25	<i>Septarium</i> .....	Lower Eocene	32 26
<i>Strombus Bartonensis</i> ...	Middle Eocene	74 60	<i>Strombus Bartonensis</i> ....	Lower Eocene	23 25
<i>Triton argutus</i> .....	Middle Eocene	75 60	<i>Thracia oblata</i> .....	Lower Eocene	105 61
<i>Triton Flandricum</i> .....	Middle Eocene	76 60	<i>Teredo antenata</i> .....	Lower Eocene	104 61
<i>Trochus monilifer</i> .....	Middle Eocene	77 60	<i>Trochus monilifer</i> .....	Lower Eocene	24 25
<i>Turritella imbricata</i> ....	Middle Eocene	78 60	<i>Vermetus Bognoriensis</i> ...	Lower Eocene	107 61
<i>Turritella terebella</i> ....	Middle Eocene	79 60	<i>Vertebra of?</i> .....	Lower Eocene	36 26
<i>Unio Solandri</i> .....	Middle Eocene	80 60	<i>Voluta nodosa</i> .....	Lower Eocene	108 61
<i>Venericardia (cardita)</i> ....	Middle Eocene	85 61	<i>Voluta Wetherellii</i> (rare)	Lower Eocene	109 61
<i>Venus tenuistriata</i> .....	Middle Eocene	86 61			
<i>Voluta ambigua</i> .....	Middle Eocene	81 60			
<i>Voluta luctator</i> .....	Middle Eocene	82 61			
<i>Voluta lima</i> .....	Middle Eocene	83 61			
<i>Voluta spinosa</i> .....	Middle Eocene	84 61			
8. LOWER EOCENE.			III. SECONDARY.		
<i>Ampullaria ambulacrum</i> ...	Lower Eocene	12 25	E. Cretaceous Group.		
<i>Axius angulatus</i> .....	Lower Eocene	13 25	9. MAESTRICHT BEDS.		
<i>Cassidaria carinata</i> ....	Lower Eocene	87 61	<i>Ananchytes ovata</i> .....	Maes. Beds	1 27
<i>Casts of fossil shells, &amp;c.</i>	Lower Eocene	14 25	<i>Baculites Fanjasii</i> .....	Maes. Beds	2 27
			<i>Belemnites Listeri</i> .....	Maes. Beds	3 27
			<i>Belemnites mucronata</i> ...	Maes. Beds	4 27
			— ? Maestricht...	Maes. Beds	5 27

MAESTRICHT BEDS— <i>continued.</i>			UPPER WHITE CHALK— <i>continued.</i>		
	No. of the Specimen.	Page.		No. of the Specimen.	Page.
Ditrupea.....	Maes. Beds	1 62	Inoceramus Brongniartii	U. whiteChalk	17 63
Nerita rugosa.....	Maes. Beds	6 27	Inoceramus Cuvieri.....	U. whiteChalk	18 63
Ostrea.....	Maes. Beds	2 62	Inoceramus.....	U. whiteChalk	19 63
Otodus appendiculatus...	Maes. Beds	7 27	Inoceramus Cuvieri.....	U. whiteChalk	40 28
Pagurus Faujasii.....	Maes. Beds	3 62	Iron pyrites, nodules of..	U. whiteChalk	41 28
Pecten quadricostatus...	Maes. Beds	8 27	Madrepore centralis.....	U. whiteChalk	44 28
Terebratula subplicata...	Maes. Beds	9 27	Marsupites Milleri.....	U. whiteChalk	42 28
			Marsupites Milleri.....	U. whiteChalk	43 28
			Millepora corymbosa.....	U. whiteChalk	20 63
			Millepora globularis.....	U. whiteChalk	21 63
			Micraster cor-anguinum..	U. whiteChalk	22 63
			Micraster rostratus var:..	U. whiteChalk	23 63
			Ostrea semiplana.....	U. whiteChalk	24 63
			Pecten.....	U. whiteChalk	47 29
			Pecten quinque-costatus..	U. whiteChalk	25 63
			Pecten membranaceus, Niln	U. whiteChalk	26 63
			Pecten nitidus.....	U. whiteChalk	45 28
			Pecten nitidus.....	U. whiteChalk	46 29
			Plagiostoma.....	U. whiteChalk	48 29
			Plagiostoma spinosa.....	U. whiteChalk	49 29
			Plagiostoma spinosa.....	U. whiteChalk	50 29
			Ptychodus latior or altior	U. whiteChalk	27 63
			Serpula.....	U. whiteChalk	29 63
			Serpula.....	U. whiteChalk	30 63
			Serpula macropus.....	U. whiteChalk	28 63
			Spatangus.....	U. whiteChalk	56 29
			Spatangus.....	U. whiteChalk	57 29
			Spatangus cor-anguinum..	U. whiteChalk	51 29
			Spatangus cor-anguinum..	U. whiteChalk	52 29
			Spatangus cor-anguinum..	U. whiteChalk	53 29
			Spatangus cor-anguinum..	U. whiteChalk	54 29
			Spatangus cor-anguinum..	U. whiteChalk	55 29
			Spondylus.....	U. whiteChalk	33 63
			Spondylus.....	U. whiteChalk	34 63
			Spondylus spinosus.....	U. whiteChalk	58 29
			Spondylus spinosus.....	U. whiteChalk	59 29
			Spondylus spinosus.....	U. whiteChalk	31 63
			Spondylus spinosus, (Pla-		
			giostoma).....	U. whiteChalk	32 63
			Sponges.....	U. whiteChalk	60 29
			Teeth of fish.....	U. whiteChalk	61 29
			Teeth of fish.....	U. whiteChalk	62 29
			Teeth of fish.....	U. whiteChalk	63 29
			Teeth of fish.....	U. whiteChalk	64 29
			Teeth of (Ptychodus) fish,		
			chalk.....	U. whiteChalk	65 29
			Terebratula carnea.....	U. whiteChalk	69 29
			Terebratula carnea ?.....	U. whiteChalk	70 29
			Terebratula carnea.....	U. whiteChalk	35 63
			Terebratula carnea.....	U. whiteChalk	36 63
			Terebratula Defranci.....	U. whiteChalk	71 29
			Terebratula Defranci.....	U. whiteChalk	72 29
			Terebratula..... ?.....	U. whiteChalk	73 29
			Terebratula.....	U. whiteChalk	74 29
			Terebratula..... ?.....	U. whiteChalk	75 29
			Terebratula..... ?.....	U. whiteChalk	76 29
10. UPPER WHITE CHALK.					
ROCKS.					
Chalk, specimen of.....	U. whiteChalk	10 27			
Chalk, specimen of.....	U. whiteChalk	11 28			
Chlorite Chalk.....	U. whiteChalk	14 28			
Chalk, several specimens					
of.....	U. whiteChalk	15 28			
Limestone from the Chalk.	U. whiteChalk	13 28			
Silicious Rock, occurring					
in thin beds in the Chalk.	U. whiteChalk	12 2			
FOSSILS.					
Ananchytes ovatus.....	U. whiteChalk	4 62			
Ananchytes ovatus.....	U. whiteChalk	5 62			
Ananchytes ovatus.....	U. whiteChalk	16 28			
Apiocrinus ellipticus.....	U. whiteChalk	17 28			
Baculites Faujasii.....	U. whiteChalk	6 62			
Belemnites mucronatus...	U. whiteChalk	18 28			
Belemnites mucronatus...	U. whiteChalk	19 28			
Belemnites mucronatus...	U. whiteChalk	7 62			
Cidaris.....	U. whiteChalk	20 28			
Cidaris clavigera.....	U. whiteChalk	8 62			
Cidaris margaritifera....	U. whiteChalk	25 28			
Cidaris margaritifera....	U. whiteChalk	21 28			
Cidaris vesiculosus& spines	U. whiteChalk	22 28			
Cidaris vesiculosa.....	U. whiteChalk	23 28			
Cidaris vesiculosa.....	U. whiteChalk	24 28			
Cidaris vesiculosa.....	U. whiteChalk	9 62			
Cidaris vesiculosa.....	U. whiteChalk	10 63			
Cidaris vesiculosa.....	U. whiteChalk	11 63			
Conulus subrotundus....	U. whiteChalk	13 63			
Conulus subrotundus....	U. whiteChalk	14 63			
Conulus subrotundus....	U. whiteChalk	26 28			
Conulus subrotundus....	U. whiteChalk	27 28			
Cyphosoma Milleri.....	U. whiteChalk	30 28			
Cyphosoma Milleri.....	U. whiteChalk	28 28			
Cyphosoma Milleri.....	U. whiteChalk	29 28			
Cyphosoma Milleri.....	U. whiteChalk	15 63			
Dianchora.....	U. whiteChalk	31 28			
Dianchora.....	U. whiteChalk	32 28			
Echinus.....	U. whiteChalk	33 28			
Echinides.....	U. whiteChalk	34 28			
Encranite.....	U. whiteChalk	35 28			
Flustra.....	U. whiteChalk	36 28			
Galerites.....	U. whiteChalk	37 28			
Galerites depressus.....	U. whiteChalk	38 28			
Holaster pilula.....	U. whiteChalk	16 63			
Hornera.....	U. whiteChalk	39 28			

UPPER WHITE CHALK— continued.		No. of the Specimen.	Page.	12. UPPER GREENSAND.	No. of the Specimen.	Page.
				ROCK.		
Terebratula—?	U. whiteChalk	77	29	Greensand rock.....	U. Greensand	98 30
Terebratula nerviensis....	U. whiteChalk	37	63			
Terebratula plicatulus....	U. whiteChalk	38	63			
Terebratula.....	U. whiteChalk	66	29	FOSSILS.		
Terebratula.....	U. whiteChalk	67	29	Achilleum voluta.....	U. Greensand	65 64
Terebratula semiglobosa....	U. whiteChalk	39	63	Ammonites varicosus.....	U. Greensand	66 64
Terebratula semiglobosa....	U. whiteChalk	40	63	Ammonites varicosus....	U. Greensand	67 64
Terebratula subplicata....	U. whiteChalk	68	29	Cardium Hillanum.....	U. Greensand	99 30
Terebratula striata.....	U. whiteChalk	78	29	Cardium Hillanum.....	U. Greensand	100 30
Ventriculites.....	U. whiteChalk	41	63	Cidaris.....	U. Greensand	101 30
Vertebrated animal.....	U. whiteChalk	82	29	Cyprina cuneata.....	U. Greensand	103 30
Ventriculites chalk.....	U. whiteChalk	80	29	Cytherea caperata.....	U. Greensand	104 30
Ventriculites, in flint....	U. whiteChalk	42	63	Cyprina angulata.....	U. Greensand	69 64
Ventriculites simplex.....	U. whiteChalk	43	63	Cyprina angulata.....	U. Greensand	70 64
Ventriculites simplex....	U. whiteChalk	79	29	Cucullæa carinata.....	U. Greensand	102 30
Ventriculites radiatus....	U. whiteChalk	81	29	Cucullæa carinata.....	U. Greensand	68 64
				Discoidea subuculus....	U. Greensand	105 30
				Discoidea subuculus....	U. Greensand	71 64
				Exogyra conica.....	U. Greensand	106 30
				Exogyra conica.....	U. Greensand	72 64
				Gryphea columba.....	U. Greensand	107 30
11. LOWER WHITE CHALK.				Inoceramus concentricus..	U. Greensand	73 64
Ammonites Mantelli.....	L. whiteChalk	83	30	Pecten umbonatus.....	U. Greensand	75 64
Astartes Sussexiensis....	L. whiteChalk	84	30	Pecten quadricostatus...	U. Greensand	74 64
Belemnites dilatatus.....	L. whiteChalk	45	63	Pecten quinquecostatus...	U. Greensand	108 30
Belemnites lanceolatus....	L. whiteChalk	44	63	Spatangus curvatus.....	U. Greensand	77 64
Bryoz ornatus.....	L. whiteChalk	46	64	Siphonia pyriformis.....	U. Greensand	109 30
Catellus Cuvieri.....	L. whiteChalk	85	30	Siphonia pyriformis.....	U. Greensand	76 64
Coprolite in chalk marl..	L. whiteChalk	86	30	Sponges.....	U. Greensand	78 64
Coprolite of fish.....	L. whiteChalk	87	30	Sponges.....	U. Greensand	79 64
Discoidea subuculus....	L. whiteChalk	47	64	Sponges.....	U. Greensand	80 65
Fish, head of.....	L. whiteChalk	48	64	Spongia.....	U. Greensand	110 30
Galerites vulgaris.....	L. whiteChalk	49	64	Terebratula biplicata....	U. Greensand	111 31
Garrangopsis dorsalis....	L. whiteChalk	88	30	Venus caperata.....	U. Greensand	82 65
Holaster.....	L. whiteChalk	90	30	Vermicularia concava....	U. Greensand	81 65
Holaster?.....	L. whiteChalk	91	30	Venus lineolata.....	U. Greensand	113 31
Holaster planus.....	L. whiteChalk	50	64			
Holaster subglobosus....	L. whiteChalk	51	64			
Holaster subglobosus....	L. whiteChalk	89	30			
Inoceramus annulatus....	L. whiteChalk	52	64			
Inoceramus planus.....	L. whiteChalk	53	64			
Nucula pectinata.....	L. whiteChalk	92	30	13. GAULT.		
Ostrea.....	L. whiteChalk	54	64	Ammonites Beudantii....	Gault	84 65
Ostrea carinata.....	L. whiteChalk	93	30	Ammonites dentatus.....	Gault	115 31
Ostrea carinata.....	L. whiteChalk	94	30	Ammonites dentatus....	Gault	116 31
Ostrea, Chalk Marl.....	L. whiteChalk	95	30	Ammonites inflatus var..	Gault	83 65
Pecten Beaveri.....	L. whiteChalk	55	64	Ammonites laevis.....	Gault	117 31
Pecten laminosus.....	L. whiteChalk	56	64	Ammonites proboscideus..	Gault	118 31
Plicatula pectinoides....	L. whiteChalk	57	64	Ammonites serratus.....	Gault	85 65
Scaphites equalis.....	L. whiteChalk	59	64	Ammonites splendensis & binus.....	Gault	114 31
Serpula heliciformis....	L. whiteChalk	58	64	Ammonites varicosus....	Gault	119 31
Spherulites.....	L. whiteChalk	60	64	Ammonites varians.....	Gault	120 31
Spherulites cylindricus...	L. whiteChalk	96	30	Avicula gryphæoides....	Gault	86 65
Terebratula semiglobosa....	L. whiteChalk	62	64	Dentalium ellipticum....	Gault	87 65
Terebratula subundata....	L. whiteChalk	61	64	Fungia Konigi.....	Gault	121 31
Terebratula subundata....	L. whiteChalk	97	30	Hamites attenuatus.....	Gault	122 31
Turrillites.....	L. whiteChalk	63	64	Hamites.....	Gault	123 31
Ventriculites.....	L. whiteChalk	64	64	Hamites maximus.....	Gault	124 31

# I N D E X.

v

GAULT—continued.		No. of the Specimen.	F. Wealden Group.		No. of the Specimen.	Page.
			ROCKS.			
Hamites maximus.....	Gault	88	Weald clay.....	Wealden	1	32
Inoceramus maximus. . .	Gault	89	Weald clay.....	Wealden	2	32
Inoceramus sulcatus.....	Gault	90	Weald clay.....	Wealden	3	32
Nucula ovata.....	Gault	125				
Plicatula pectinoides.....	Gault	91	FOSSILS.			
Rostellaria.....	Gault	126				
Solarium.....	Gault	92	Bufonites (fish palates)...	Wealden	1	66
Solarium ornatum.....	Gault	93	Cyclas media.....	Wealden	2	66
Spatangus.....	Gault	127	Cypris Valdensis.....	Wealden	3	66
Terebratula biplicata.....	Gault	94	Cypris Valdensis.....	Wealden	4	66
Terebratula depressa.....	Gault	112	Cypris Valdensis.....	Wealden	5	32
Terebratula obtusa.....	Gault	96	Cypris Valdensis.....	Wealden	5	66
Terebratula sulcata.....	Gault	95	Cyrena media.....	Wealden	4	32
Trochocyathus.....	Gault	97	Endogenites erosa.....	Wealden	6	32
Trochocyathus.....	Gault	98	Lonchopteris Mantelli.....	Wealden	7	32
Venericardia tenuicosta ..	Gault	128	Lonchopteris Mantelli.....	Wealden	6	66
			Paludina elongata.....	Wealden	8	32
			Paludina fluviorum.....	Wealden	9	32
			Unio Gaulteri.....	Wealden	7	66
			Unio Gaulteri.....	Wealden	8	66
§§ Lower Cretaceous Group.			G. Oolite.			
14. LOWER GREENSAND.			18. UPPER OOLITE.			
ROCKS.		L. Cretaceous	a. Portland building stone.			
Cyclas limestone.....	L. Cretaceous	99	b. Portland sand.			
Ferruginous sand.....	L. Cretaceous	100	ROCKS.			
Greensand.....	L. Cretaceous	101	Iron Oolite.....	Upper Oolite	1	67
Greensand with fossils....	L. Cretaceous	102	Oolite.....	Upper Oolite	1	32
Marls.....	L. Cretaceous	103	Oolite.....	Upper Oolite	2	33
Whitby sands.....	L. Cretaceous	104	Oolite.....	Upper Oolite	3	33
FOSSILS.			Oolite.....	Upper Oolite	5	33
Arca Raulini.....	L. Cretaceous	105	Oolite.....	Upper Oolite	6	33
Astacus vectensis.....	L. Cretaceous	106	Upper Jura limestone....	Upper Oolite	2	67
Astacus vectensis.....	L. Cretaceous	107	Upper Jura limestone....	Upper Oolite	4	33
Gervillia aviculoides.....	L. Cretaceous	129	FOSSILS.			
Gervillia aviculoides.....	L. Cretaceous	110	Ammonites biplex.....	Upper Oolite	3	67
Gervillia aviculoides.....	L. Cretaceous	111	Axinus obscurus.....	Upper Oolite	4	67
Gervillia linguloides.....	L. Cretaceous	112	Oolitic fossils (20).....	Upper Oolite	7	33
Gryphæa sinuata.....	L. Cretaceous	130	Ostrea distorta.....	Upper Oolite	8	33
Nautilus undulatus.....	L. Cretaceous	113	Trigonia gibbosa.....	Upper Oolite	9	33
Panopæa plicata.....	L. Cretaceous	108	c. Kimmeridge Clay.			
Panopæa plicata.....	L. Cretaceous	115	Ammonites biplex.....	Upper Oolite	10	33
Pecten interstriatus.....	L. Cretaceous	114	Ostrea deltoidea.....	Upper Oolite	11	33
Perna Mulleti.....	L. Cretaceous	131	Pinna ampla.....	Upper Oolite	12	33
Serpula.....	L. Cretaceous	116	Terebratula inconstans....	Upper Oolite	13	33
Sphæra corrugata.....	L. Cretaceous	132	Terebratula intermedia....	Upper Oolite	14	33
Terebratula Gibbsii.....	L. Cretaceous	133	Thracia depressa.....	Upper Oolite	15	33
Terebratula sella.....	L. Cretaceous	135				
Terebratula sella.....	L. Cretaceous	136				
Terebratula sella.....	L. Cretaceous	117				
Teredina, in wood.....	L. Cretaceous	118				
Thetis minor.....	L. Cretaceous	119				
Thetis minor.....	L. Cretaceous	134				
Turritella, &c.....	L. Cretaceous	109				



19. MIDDLE OOLITE.	No. of the Specimen.	Page.	MIDDLE OOLITE—continued.	No. of the Specimen.	Page.
<i>a. Coral Rag.</i>			<i>Belemnites hastatus</i> . . . . .	Middle Oolite 42	34
<i>Ammonites callovienensis</i> . . . . .	Middle Oolite 19	67	<i>Belemnites lanciliculatus</i> . . . . .	Middle Oolite 40	34
<i>Astrea</i> . . . . .	Middle Oolite 16	33	<i>Belemnites lanciliculatus</i> . . . . .	Middle Oolite 41	34
<i>Astrea limbata</i> . . . . .	Middle Oolite 5	67	<i>Gryphæa dilatata</i> . . . . .	Middle Oolite 44	34
<i>Astrea ovata</i> . . . . .	Middle Oolite 6	67	<i>Gryphæa dilatata</i> . . . . .	Middle Oolite 45	34
<i>Astarte ovata</i> . . . . .	Middle Oolite 17	83	<i>Lima læviscula</i> . . . . .	Middle Oolite 47	34
<i>Astarte cypricardia</i> (modiolaris) . . . . .	Middle Oolite 18	33	<i>Lima rigida</i> . . . . .	Middle Oolite 46	34
<i>Caryophyllia annularis</i> . . . . .	Middle Oolite 19	33	<i>Modiola bipartita</i> . . . . .	Middle Oolite 48	34
<i>Caryophyllia annulatus</i> . . . . .	Middle Oolite 20	33	<i>Ostrea calcareous</i> gilt . . . . .	Middle Oolite 49	34
<i>Ceripora radiceformis</i> . . . . .	Middle Oolite 7	67	<i>Ostrea gregaria</i> . . . . .	Middle Oolite 50	34
<i>Cidaris Blumenbachii</i> . . . . .	Middle Oolite 8	67	<i>Ostrea Marshii</i> . . . . .	Middle Oolite 51	34
<i>Cidaris Blumenbachii</i> . . . . .	Middle Oolite 21	33	<i>Ostrea Marshii</i> . . . . .	Middle Oolite 52	34
<i>Cidaris crenularis</i> . . . . .	Middle Oolite 9	67	<i>Panopæa gibbosa</i> . . . . .	Middle Oolite 29	68
<i>Coral rag</i> . . . . .	Middle Oolite 10	67	<i>Plesiosaurus, vertebra of</i> . . . . .	Middle Oolite 53	34
<i>Coral rag</i> . . . . .	Middle Oolite 23	33	<i>Rostellaria</i> . . . . .	Middle Oolite 30	68
<i>Corals, corallines</i> . . . . .	Middle Oolite 22	33	<i>Terebratula impressa</i> . . . . .	Middle Oolite 54	34
<i>Corals</i> . . . . .	Middle Oolite 24	33			
<i>Hemicidaris intermedia</i> . . . . .	Middle Oolite 25	33	20. LOWER OOLITE.		
<i>Hemicidaris intermedia</i> . . . . .	Middle Oolite 26	33	<i>a. Cornbrash.</i>		
<i>Lithodomus inclusus</i> . . . . .	Middle Oolite 11	67	<i>Acrosalenia hemidarioides</i> . . . . .	Lower Oolite 55	34
<i>Nucleolites clunicularis</i> . . . . .	Middle Oolite 12	67	<i>Nucleolites clunicularis</i> . . . . .	Lower Oolite 56	34
<i>Pecten coralline</i> . . . . .	Middle Oolite 27	33	<i>Nucleolites depressus</i> . . . . .	Lower Oolite 32	68
<i>Pecten levis</i> . . . . .	Middle Oolite 13	67	<i>Ostrea Marshii</i> . . . . .	Lower Oolite 33	68
<i>Pentacrinites pentagonalis</i> . . . . .	Middle Oolite 14	67	<i>Pholadomya lirata</i> . . . . .	Lower Oolite 57	34
<i>Pecopteris tenuis</i> . . . . .	Middle Oolite 16	67	<i>Pholadomya producta</i> . . . . .	Lower Oolite 58	35
<i>Pterophyllum comptum</i> . . . . .	Middle Oolite 17	67	<i>Pholadomya producta</i> . . . . .	Lower Oolite 59	35
<i>Pterophyllum comptum</i> . . . . .	Middle Oolite 18	67	<i>Terebratula intermedia</i> . . . . .	Lower Oolite 34	68
<i>Terebratula biplicata</i> . . . . .	Middle Oolite 15	67	<i>Terebratula intermedia</i> . . . . .	Lower Oolite 60	35
<i>Terebratula ornithocephala</i> . . . . .	Middle Oolite 20	67	<i>Terebratula lagenalis</i> . . . . .	Lower Oolite 35	68
<i>Terebratula pectunculus</i> . . . . .	Middle Oolite 28	33	<i>Terebratula lagenalis</i> . . . . .	Lower Oolite 61	35
			<i>Terebratula lagenalis</i> . . . . .	Lower Oolite 62	35
<i>b. Oxford Clay.</i>			<i>Terebratula obovata</i> . . . . .	Lower Oolite 36	68
<i>Ammonites athleta</i> . . . . .	Middle Oolite 29	34			
<i>Ammonites Brightii</i> . . . . .	Middle Oolite 21	67	<i>a. Forest Marble.</i>		
<i>Ammonites Comptoni</i> . . . . .	Middle Oolite 22	67	<i>Forest marble</i> . . . . .	Lower Oolite 63	35
<i>Ammonites Comptoni</i> . . . . .	Middle Oolite 23	67	<i>Fish palate</i> . . . . .	Lower Oolite 64	35
<i>Ammonites cordatus</i> . . . . .	Middle Oolite 30	34	<i>Fish palates</i> . . . . .	Lower Oolite 65	35
<i>Ammonites cristatus</i> . . . . .	Middle Oolite 31	34	<i>Ilyobodus</i> . . . . .	Lower Oolite 66	35
<i>Ammonites cristatus?</i> . . . . .	Middle Oolite 32	34	<i>Mys, var: scripta</i> . . . . .	Lower Oolite 67	35
<i>Ammonites Duncani</i> . . . . .	Middle Oolite 33	34	<i>Terebratula maxillata</i> . . . . .	Lower Oolite 68	35
<i>Ammonites Elizabethæ</i> . . . . .	Middle Oolite 24	67	<i>Terebratula varians</i> . . . . .	Lower Oolite 69	35
<i>Ammonites Elizabethæ</i> . . . . .	Middle Oolite 25	67	<i>Trigonia nullus</i> . . . . .	Lower Oolite 70	35
<i>Ammonites excavatus</i> . . . . .	Middle Oolite 26	68			
<i>Ammonites Gowerianus</i> . . . . .	Middle Oolite 34	34	<i>b. Great Oolite.</i>		
<i>Ammonites hecticus</i> . . . . .	Middle Oolite 27	68	<i>Astarte rhomboidalis</i> . . . . .	Lower Oolite 37	68
<i>Ammonites Jason or Elizabethæ</i> . . . . .	Middle Oolite 35	34	<i>Gervillia actua</i> . . . . .	Lower Oolite 38	68
<i>Ammonites Knightii</i> . . . . .	Middle Oolite 36	34	<i>Lima cardiodoides</i> . . . . .	Lower Oolite 71	35
<i>Ammonites Lamberti</i> . . . . .	Middle Oolite 37	34	<i>Modiola aspera</i> . . . . .	Lower Oolite 72	35
<i>Ammonites Lamberti</i> . . . . .	Middle Oolite 28	68	<i>Modiola imbricata</i> . . . . .	Lower Oolite 39	68
<i>Ammonites vertebralis</i> . . . . .	Middle Oolite 29	68	<i>Ostrea acuminata</i> . . . . .	Lower Oolite 73	35
<i>Belemnites</i> . . . . .	Middle Oolite 43	34	<i>Ostrea gregaria</i> . . . . .	Lower Oolite 75	35
<i>Belemnites abbreviatus</i> . . . . .	Middle Oolite 38	34			
<i>Belemnites elongatus?</i> . . . . .	Middle Oolite 39	34			

LOWER OOLITE— <i>continued.</i>	No. of the Specimen.	Page.	LOWER OOLITE— <i>continued.</i>	No. of the Specimen.	Page.
<i>Ostrea palmetta</i> .....	Lower Oolite	74 35	<i>Terebratula varians</i> .....	Lower Oolite	112 36
<i>Pecten laminatus</i> .....	Lower Oolite	80 35	<i>Terebratula varians</i> .....	Lower Oolite	48 68
<i>Patella rugosa</i> .....	Lower Oolite	76 35			
<i>Pecten vagans</i> .....	Lower Oolite	78 35			
<i>Pecten vagans</i> .....	Lower Oolite	79 35			
<i>Pecten vimineus</i> .....	Lower Oolite	77 35			
<i>Pholadomya</i> .....	Lower Oolite	81 35	<i>d. Inferior Oolite.</i>		
<i>Pholadomya</i> .....	Lower Oolite	82 35	<i>Amphidesina decustatum</i> ..	Lower Oolite	114 36
<i>Pteroperna costatula</i> ....	Lower Oolite	84 35	<i>Amphidesma secuneforme</i> ..	Lower Oolite	115 36
<i>Serpulæ</i> .....	Lower Oolite	85 35	<i>Ammonites concavus</i> .....	Lower Oolite	116 36
<i>Serpulæ</i> .....	Lower Oolite	86 35	<i>Ammonites falcifer</i> ?... ..	Lower Oolite	117 36
<i>Terebratula</i> .....	Lower Oolite	88 35	<i>Ammonites Humphriesia-</i> <i>nus</i> .....	Lower Oolite	118 36
<i>Terebratula concinna</i> , Sow:	Lower Oolite	87 35	<i>Ammonites Parkinsoni</i> ..	Lower Oolite	119 36
<i>Terebratula intermedia</i> ....	Lower Oolite	40 68	<i>Ammonites Parkinsoni</i> ..	Lower Oolite	120 36
<i>Terebratula maxillata</i> ....	Lower Oolite	89 35	<i>Ammonites Parkinsoni</i> ..	Lower Oolite	49 68
<i>Terebratula maxillata</i> ....	Lower Oolite	90 35	<i>Ammonites spinatus</i> ....	Lower Oolite	123 36
<i>Terebratula maxillata</i> ....	Lower Oolite	41 68	<i>Ammonites Yeovil</i> ....	Lower Oolite	113 36
<i>Terebratula orbicularis</i> ....	Lower Oolite	42 68	<i>Astarte elegans</i> ....	Lower Oolite	50 68
<i>Trochus punctatus</i> .....	Lower Oolite	91 35	<i>Astarte elegans</i> ....	Lower Oolite	51 68
			<i>Astarte elegans</i> ....	Lower Oolite	121 36
			<i>Astarte modiolaris</i> ....	Lower Oolite	122 36
			<i>Astarte modiolaris</i> ....	Lower Oolite	52 68
<i>b. Bradford Clay.</i>			<i>Belemnite showing alveo-</i> <i>lus</i> .....	Lower Oolite	53 69
<i>Apiocrinus Parkinsoni</i> ....	Lower Oolite	92 35	<i>Circus</i> .....	Lower Oolite	125 36
<i>Apiocrinus Parkinsoni</i> ..	Lower Oolite	93 36	<i>Circus</i> .....	Lower Oolite	126 36
<i>Apiocrinus Parkinsoni</i> ..	Lower Oolite	94 36	<i>Clyphus</i> .....	Lower Oolite	129 37
<i>Apiocrinus rotundus</i> ....	Lower Oolite	43 68	<i>Clyphus</i> .....	Lower Oolite	130 37
<i>Ostrea costatus</i> .....	Lower Oolite	44 68	<i>Clyphus sinuatus</i> .....	Lower Oolite	131 37
<i>Terebratula coarctata</i> , Par-			<i>Clyphus sinuatus</i> .....	Lower Oolite	127 37
<i>kinsoni</i> .....	Lower Oolite	95 36	<i>Clyphus sinuatus</i> .....	Lower Oolite	128 37
<i>Terebratula coarctata</i> ....	Lower Oolite	45 68	<i>Discoidea depressa</i> ....	Lower Oolite	132 37
<i>Terebratula obsoleta</i> .....	Lower Oolite	98 36	<i>Discoidea hemispherica</i> ..	Lower Oolite	54 69
<i>Terebratula concinna</i> ....	Lower Oolite	96 36	<i>Isocaria concentrica</i> ....	Lower Oolite	133 37
<i>Terebratula digona</i> .....	Lower Oolite	97 36	<i>Lima Bajocensis</i> .....	Lower Oolite	134 37
			<i>Lutraria Jurrassi</i> .....	Lower Oolite	135 37
<i>b. Stonesfield Slate.</i>			<i>Modiola</i> .....	Lower Oolite	137 37
<i>Ammonites, Stonesfield</i> <i>slate</i> .....	Lower Oolite	99 36	<i>Modiola plicata</i> .....	Lower Oolite	136 37
<i>Ammonites, Stonesfield</i> <i>slate</i> .....	Lower Oolite	100 36	<i>Melania striata</i> .....	Lower Oolite	138 37
<i>Seeds, in Stonesfield slate</i> ..	Lower Oolite	101 36	<i>Ostrea</i> .....	Lower Oolite	140 37
<i>Stonesfield slate</i> .....	Lower Oolite	102 36	<i>Ostrea</i> .....	Lower Oolite	141 37
<i>Stonesfield slate</i> .....	Lower Oolite	103 36	<i>Ostrea Marshii</i> , Sow :...	Lower Oolite	139 37
<i>Thuytes divaricatus</i> ....	Lower Oolite	105 36	<i>Panopæa peregrina</i> .....	Lower Oolite	149 37
<i>Thuytes expansus</i> .....	Lower Oolite	106 36	<i>Pecten, inferior oolite</i> ....	Lower Oolite	124 36
<i>Terebratula impressa</i> ....	Lower Oolite	104 36	<i>Pholadomya fiducula</i> ....	Lower Oolite	148 37
<i>Trigonia impressa</i> .....	Lower Oolite	107 36	<i>Plagiostoma cardiiformis</i> ..	Lower Oolite	143 37
			<i>Plagiostoma duplicata</i> ....	Lower Oolite	142 37
			<i>Pleurotomaria ornata</i> ....	Lower Oolite	55 69
<i>c. Fullers Earth.</i>			<i>Pleurotomaria ornata</i> ....	Lower Oolite	144 37
<i>Terebratula ornithocephala</i>	Lower Oolite	46 68	<i>Pleurotomaria ornata</i> ....	Lower Oolite	145 37
<i>Terebratula ornithocephala</i>	Lower Oolite	47 68	<i>Pleurotomaria pyramidalis</i>	Lower Oolite	146 37
<i>Terebratula ornithocephala</i>	Lower Oolite	108 36	<i>Pleurotomaria variabilis</i> ..	Lower Oolite	147 37
<i>Terebratula ornithocephala</i>	Lower Oolite	109 36	<i>Sponges</i> .....	Lower Oolite	150 37
<i>Terebratula socialis</i> ....	Lower Oolite	110 36	<i>Terebratula</i> ?.....	Lower Oolite	56 69
<i>Terebratula socialis</i> ....	Lower Oolite	111 36	<i>Terebratula angulata</i> ....	Lower Oolite	57 69
			<i>Terebratula cornuta</i> ....	Lower Oolite	59 69

LOWER OOLITE—continued.		No. of the Specimen.	Page.	H. Lias Group.		No. of the Specimen.	Page.
Terebratula cynocephala.	Lower Oolite	60	69	ROCKS.			
Terebratula fimbria.	Lower Oolite	61	69	Clay in Lias.	Lias	3	39
Terebratula fimbria, Sow.	Lower Oolite	151	37	Dichter gryphytenkalk.	Lias	21	39
Terebratula globata.	Lower Oolite	152	37	Lias.	Lias	3	69
Terebratula perovalis.	Lower Oolite	62	69	Lias.	Lias	1	39
Terebratula plicata.	Lower Oolite	153	37	Lias.	Lias	2	39
Terebratula Phillipsii.	Lower Oolite	154	37	Lias marl, containing remains of a Saurian.	Lias	1	69
Terebratula spinosa.	Lower Oolite	155	37	Lias marl.	Lias	2	69
Terebratula spinosa.	Lower Oolite	63	69	Sandstone in Lias.	Lias	4	39
Terebratula spheroidal.	Lower Oolite	64	69	Upper Lias sandstone.	Lias	5	39
Terebratula submaxillata, Davidson.	Lower Oolite	156	37	Lower Lias sandstone.	Lias	6	39
Terebratula vullata.	Lower Oolite	58	69	FOSSILS.			
Trigonia clavellata.	Lower Oolite	159	37	Acrodus nobilis.	Lias	4	69
Trigonia costata.	Lower Oolite	157	37	Aircula.	Lias	8	39
Trigonia.	Lower Oolite	158	37	Ammonites.	Lias	9	39
Trochus duplicatus.	Lower Oolite	160	37	Ammonites.	Lias	10	39
Vermetus concinnus.	Lower Oolite	65	69	Ammonites.	Lias	11	39
Wood, fossil, bored by Pholas.	Lower Oolite	161	37	Ammonites.	Lias	12	39
FOSSILS OF OOLITE AND LIAS				Ammonites.	Lias	5	69
Ammonites annulatus.	Lower Oolite	2	38	Ammonites bifrons.	Lias	6	69
Ammonites armatus.	Lower Oolite	1	38	Ammonites bifrons ?.	Lias	7	69
Ammonites communis.	Lower Oolite	4	38	Ammonites Birchii.	Lias	8	69
Ammonites communis.	Lower Oolite	5	38	Ammonites costatus.	Lias	9	69
Ammonites costatus.	Lower Oolite	6	38	Ammonites obtusus.	Lias	14	39
Ammonites fifer.	Lower Oolite	3	38	Ammonites ornatus.	Lias	13	39
Ammonites margaritatus.	Lower Oolite	7	38	Ammonites planecostatus.	Lias	15	39
Ammonites obtusus.	Lower Oolite	8	38	Ammonites planorbis.	Lias	16	39
Ammonites oxynotus.	Lower Oolite	9	38	Ammonites Walcottii.	Lias	17	39
Ammonites oxynotus.	Lower Oolite	10	38	Ammonites Walcottii.	Lias	18	39
Ammonites planicosta.	Lower Oolite	11	38	(Amphidesma) panopæa, donaciforme.	Lias	11	69
Ammonites planicosta.	Lower Oolite	12	38	Avicula longicostata.	Lias	12	69
Ammonites serpentinus.	Lower Oolite	13	38	Belemnites.	Lias	19	39
Ammonites Walcottii.	Lower Oolite	14	38	Belemnites digitalis.	Lias	20	39
Cardinia elongata.	Lower Oolite	15	38	Belemnites digitalis.	Lias	13	69
Corbula cardioides.	Lower Oolite	16	38	Coprolites.	Lias	14	69
Corbula cardioides.	Lower Oolite	17	38	Gryphaea arcuata.	Lias	22	39
Gryphaea incurva.	Lower Oolite	18	38	Gryphaea cymbrium.	Lias	15	69
Gryphaea Maccullochii.	Lower Oolite	19	38	Gryphaea incurva.	Lias	16	69
Hippopodium ponderosum.	Lower Oolite	20	38	Hybodus Becbei.	Lias	17	69
Lima gigantea.	Lower Oolite	21	38	Ichthyosaurus.	Lias	18	69
Lima Hermannii.	Lower Oolite	22	38	Ichthyosaurus.	Lias	19	69
Modiola scalprum.	Lower Oolite	23	38	Ichthyosaurus.	Lias	20	69
Pholadomya ambigua.	Lower Oolite	25	38	Ichthyosaurus.	Lias	21	70
Pterophyllum comptum.	Lower Oolite	26	38	Lima gigantea.	Lias	22	70
Pecten equivalvis.	Lower Oolite	24	38	Monotisakalk.	Lias	23	39
Terebratula numismatis.	Lower Oolite	27	38	Nautilus.	Lias	24	39
Terebratula punctata.	Lower Oolite	28	38	Nucula ovum.	Lias	23	70
Terebratula punctata.	Lower Oolite	29	38	Ophiura.	Lias	25	70
Terebratula rimosa.	Lower Oolite	30	38	Ophiura Egertoni.	Lias	24	70
Terebratula tetrahedra.	Lower Oolite	31	38	Pachyodon attenuatus.	Lias	26	39
Terebratula tetrahedra.	Lower Oolite	32	38	Papierschiefer.	Lias	7	39
				Pecten.	Lias	26	70

# INDEX.

ix

LIAS—continued.		No. of the Specimen.	Page.	K. Permian Group.		No. of the Specimen.	Page.
				UPPER PERMIAN.			
				ROCKS.			
Pecten equivalvis. . . . .	Lias	27	70	Aelterer Stütz gyps . . . . .	U. Permian	1	41
Pentamerinites . . . . .	Lias	27	39	Aelterer Stütz gyps . . . . .	U. Permian	2	41
Posidonienschiefer . . . . .	Lias	25	39	Bituminous marl slate . . . . .	U. Permian	1	71
Spirifer rostratus . . . . .	Lias	28	70	Cavernous magnesian lime-			
Terebratula . . . . .	Lias	29	39	stone . . . . .	U. Permian	2	71
Terebratula furcillata . . . . .	Lias	29	70	Dolomitischer gyphiten-			
Terebratula numismalis . . . . .	Lias	30	70	kalk . . . . .	U. Permian	3	41
Terebratula tetrahedra . . . . .	Lias	31	70	Early swinestone . . . . .	U. Permian	3	71
Tetragonolepis . . . . .	Lias	30	39	Kupferschiefer . . . . .	U. Permian	5	41
Trochus . . . . .	Lias	28	39	Limestone . . . . .	U. Permian	7	41
Unio hybrida . . . . .	Lias	31	39	Magnesian limestone . . . . .	U. Permian	8	41
I. Trias Group.				Magnesian limestone . . . . .	U. Permian	9	41
UPPER TRIAS.				Magnesian limestone . . . . .	U. Permian	10	41
ROCKS.				Magnesian limestone . . . . .	U. Permian	11	41
Bunter Sandstein . . . . .	Upper Trias	1	40	Magnesian limestone . . . . .	U. Permian	12	41
Crystalline Muschelkalk . . . . .	Upper Trias	4	70	Magnesian limestone . . . . .	U. Permian	14	41
Dolomitischer Keupermer-				Permian limestone . . . . .	U. Permian	15	41
gel . . . . .	Upper Trias	2	40	Lauchwache . . . . .	U. Permian	4	41
Keuper Sandstein . . . . .	Upper Trias	3	40	Weisstod liegendes . . . . .	U. Permian	6	41
Keuper Sandstein . . . . .	Upper Trias	4	40	Zechstein . . . . .	U. Permian	13	41
Keuper Sandstein . . . . .	Upper Trias	5	40	Zechstein formation lime-			
Keuper Sandstone . . . . .	Upper Trias	3	70	stone . . . . .	U. Permian	4	71
Muschelkalk . . . . .	Upper Trias	6	40	FOSSILS.			
Muschelkalk . . . . .	Upper Trias	7	40	Caulerpites selaginoides . . . . .	U. Permian	16	41
New Red Sandstone . . . . .	Upper Trias	8	40	Fienestella retiformis . . . . .	U. Permian	17	41
New Red Sandstone . . . . .	Upper Trias	9	40	Fienestella virgulifera . . . . .	U. Permian	5	71
New Red Sandstone . . . . .	Upper Trias	1	70	Gorgonia infundibuliformis . . . . .	U. Permian	18	41
FOSSILS.				Productus aculeatus . . . . .	U. Permian	6	71
Nothosaurus mirabilis . . . . .	Upper Trias	2	70	Productus calvus . . . . .	U. Permian	19	41
Roggenstein . . . . .	Upper Trias	10	40	LOWER PERMIAN.			
MIDDLE TRIAS.							
ROCKS.							
Lower Muschelkalk . . . . .	Middle Trias	5	70	Palmoniscus Frieslebeni . . . . .	L. Permian	8	71
FOSSILS.				Pecten pusillus . . . . .	L. Permian	7	71
Avicula socialis . . . . .	Middle Trias	6	70	L. Carboniferous Group.			
Avicula socialis . . . . .	Middle Trias	11	40	ROCKS.			
Buccinum corrugatum . . . . .	Middle Trias	7	70	Anthracite . . . . .	Carboniferous	1	72
Ceratites nodosus . . . . .	Middle Trias	12	40	Anthracite . . . . .	Carboniferous	26	43
Ceratodus Guelmi . . . . .	Middle Trias	9	70	Black band iron stone . . . . .	Carboniferous	13	42
Cytherium cinctum . . . . .	Middle Trias	8	70	Black shale . . . . .	Carboniferous	16	42
Draconosaurus Bronnii . . . . .	Middle Trias	10	70	Brown coal sandstone . . . . .	Carboniferous	3	72
Enerinus lilliformis . . . . .	Middle Trias	11	70	Cellular tufaceous lime-			
Enerinus lilliformis . . . . .	Middle Trias	12	70	stone . . . . .	Carboniferous	18	42
Gervillia socialis . . . . .	Middle Trias	13	40	Clay . . . . .	Carboniferous	4	42
Ichthyosaurus . . . . .	Middle Trias	13	70	Clay ironstone . . . . .	Carboniferous	10	42
Lima lineata . . . . .	Middle Trias	14	40	Clay ironstone . . . . .	Carboniferous	11	42
Lycopodiolites arborens . . . . .	Middle Trias	14	70	Clay ironstone . . . . .	Carboniferous	12	42
Lynodon trigonolites . . . . .	Middle Trias	15	70	Clay shale . . . . .	Carboniferous	3	42
Myacites elongatus . . . . .	Middle Trias	16	70	Coal sandstone . . . . .	Carboniferous	2	72
Myophoria vulgaris . . . . .	Middle Trias	17	70	Coal . . . . .	Carboniferous	27	43
Nothosaurus mirabilis . . . . .	Middle Trias	15	40				
Syrtolithen . . . . .	Middle Trias	16	40				

CARBONIFEROUS— <i>continued</i> .	No. of the Specimen.	Page.	CARBONIFEROUS— <i>continued</i> .	No. of the Specimen.	Page.
Coal common.....	Carboniferous	28 43	Orbicula.....	Carboniferous	11 72
Coal.....	Carboniferous	29 43	Palæoniscum Wratislaviensis.....	Carboniferous	64 44
Coal.....	Carboniferous	30 43	Pecopteris.....	Carboniferous	12 72
Coal.....	Carboniferous	31 43	Pecopteris.....	Carboniferous	13 72
Coal.....	Carboniferous	33 43	Pecopteris aspidioides...	Carboniferous	14 72
Coal.....	Carboniferous	34 43	Pecopteris cistii.....	Carboniferous	15 72
Coal.....	Carboniferous	35 43	Pecopteris cyathea.....	Carboniferous	16 72
Coal.....	Carboniferous	36 43	Pecopteris cyathea?.....	Carboniferous	17 72
Coal parrot.....	Carboniferous	32 43	Pecopteris Milhoni &c. ...	Carboniferous	18 72
Channel coal.....	Carboniferous	37 43	Pecopteris muricata.....	Carboniferous	19 72
Channel coal.....	Carboniferous	38 43	Pecopteris plumosa.....	Carboniferous	20 72
Channel and common coal..	Carboniferous	39 43	Pecopteris polymorpha..	Carboniferous	21 72
Fire clay.....	Carboniferous	5 42	Pecopteris polymorpha..	Carboniferous	22 72
Fire clay.....	Carboniferous	6 42	Pecopteris Serlii.....	Carboniferous	23 72
Fire clay.....	Carboniferous	7 42	Pentremites floreali.....	Carboniferous	24 72
Fire clay.....	Carboniferous	8 42	Rhomboidal scales.....	Carboniferous	58 43
Fire clay.....	Carboniferous	9 42	Sandstone.....	Carboniferous	56 43
Flinty slate.....	Carboniferous	19 42	Shale.....	Carboniferous	55 43
Iron clay.....	Carboniferous	14 42	Shale.....	Carboniferous	57 43
Iron stone.....	Carboniferous	15 42	Sigillaria.....	Carboniferous	25 72
Kohlensandstein.....	Carboniferous	23 42	Sigillaria.....	Carboniferous	26 72
Molasse.....	Carboniferous	22 42	Sphenopteris affinis.....	Carboniferous	59 44
Shale bituminous.....	Carboniferous	1 42	Sphenopteris.....	Carboniferous	60 44
Shale bituminous.....	Carboniferous	2 42	Sphenopteris.....	Carboniferous	61 44
Shale bituminous.....	Carboniferous	4 72	Sphenopteris elegans.....	Carboniferous	62 44
Sandstone, shale interstratified.....	Carboniferous	25 43	Sphenopteris elegans.....	Carboniferous	27 72
Shale.....	Carboniferous	17 42	Sphenopteris latifolia.....	Carboniferous	63 44
Sandstone.....	Carboniferous	20 42	Sphenopteris trifoliata.....	Carboniferous	28 72
Sandstone.....	Carboniferous	21 42	Trigonocarpum Noggerathii.....	Carboniferous	29 72
Sandstone.....	Carboniferous	24 42	Unio carbonarius.....	Carboniferous	66 44
			Vegetable impressions....	Carboniferous	67 44
FOSSILS.			MOUNTAIN LIMESTONE.		
Casts of trees.....	Carboniferous	65 44	ROCKS.		
Calamite.....	Carboniferous	41 43	Mountain limestone.....	Carboniferous	30 73
Calamite.....	Carboniferous	42 43	Mountain limestone.....	Carboniferous	31 73
Calamite.....	Carboniferous	43 43	Mountain limestone.....	Carboniferous	91 45
Calamite.....	Carboniferous	44 43	Mountain limestone.....	Carboniferous	92 45
Calamite.....	Carboniferous	45 43	Mountain limestone.....	Carboniferous	93 45
Circular scale.....	Carboniferous	53 43	FOSSILS.		
Coprolite of a Saurian...	Carboniferous	46 43	Bellerophon cornuarietis..	Carboniferous	68 44
Cyclopteris flabelliformis..	Carboniferous	5 72	Bellerophon tenuifascia..	Carboniferous	69 44
Favularia tissillata.....	Carboniferous	50 43	Calanispora megastoma...	Carboniferous	70 44
Fern leaves.....	Carboniferous	48 43	Chatetes radicans.....	Carboniferous	71 44
Figularia.....	Carboniferous	49 43	Cirrus retundatus.....	Carboniferous	72 44
Fishbone.....	Carboniferous	51 43	Clymenia undulata.....	Carboniferous	73 44
Fish scales.....	Carboniferous	52 43	Crinoidal stems.....	Carboniferous	74 44
Fossils.....	Carboniferous	40 43	Cochliodus.....	Carboniferous	33 73
Equiseta.....	Carboniferous	47 43	Cyathophyllia?.....	Carboniferous	75 44
Gyracanthus formosus.....	Carboniferous	54 43	Cyathophyllum basaltiforme.....	Carboniferous	78 44
Megalichthys Hibberti.....	Carboniferous	6 72			
Megalichthys Hibberti.....	Carboniferous	7 72			
Megalichthys Hibberti.....	Carboniferous	8 72			
Megalichthys Hibberti.....	Carboniferous	9 72			
Neuropteris Loshii.....	Carboniferous	10 72			

CARBONIFEROUS— <i>continued</i> .	No. of the Specimen.	Page.	CARBONIFEROUS— <i>continued</i> .	No. of the Specimen.	Page.
Cyathophyllum fungites..	Carboniferous	77 44	Spirifer glabra.....	Carboniferous	117 45
Cyathophyllum turbina- tum.....	Carboniferous	79 44	Spirifer glabra.....	Carboniferous	118 45
Cyathophyllum turbina- tum.....	Carboniferous	76 44	Spirifer papilionacea....	Carboniferous	123 46
Cyathocrinitis rugosa..	Carboniferous	32 73	Spirifer resupinata....	Carboniferous	120 45
Enerinite.....	Carboniferous	80 44	Spirifer rhomboida....	Carboniferous	121 45
Enerinite.....	Carboniferous	81 44	Spirifer striatus.....	Carboniferous	124 46
Enerinite.....	Carboniferous	82 44	Spirifer striatus.....	Carboniferous	41 73
Enerinite.....	Carboniferous	83 44	Syringopora ramulosa....	Carboniferous	126 46
Enerinitic limestone..	Carboniferous	34 73	Terebratula.....	Carboniferous	132 46
Euomphalus Dionysii...	Carboniferous	84 44	Terebratula acuminata...	Carboniferous	131 46
Euomphalus pentangula- tus.....	Carboniferous	85 45	Terebratula hastata....	Carboniferous	133 46
Euomphalus pentangula- tus.....	Carboniferous	35 73	Terebratula prisca.....	Carboniferous	130 46
Fish scales.....	Carboniferous	86 45	Terebratula pugnus.....	Carboniferous	127 46
Goniatites sphericus....	Carboniferous	87 45	Terebratula pugnus.....	Carboniferous	128 46
Lithodendron sociale....	Carboniferous	88 45	Terebratula pugnus.....	Carboniferous	129 46
Michelinia tenuisepta....	Carboniferous	89 45	Tulobite.....	Carboniferous	134 46
Muscle.....	Carboniferous	90 45	<b>M. Devonian Group.</b>		
Nacula.....	Carboniferous	37 73	Astræa.....	Upper Dev.	1 73
Naticia plicestria.....	Carboniferous	95 45	Astræa helianthoides....	Upper Dev.	2 73
Naticopsis Phillipsii...	Carboniferous	36 73	Bellerophon.....	Upper Dev.	3 73
Nautilus, mountain lime- stone.....	Carboniferous	94 45	Cyathophyllum cuspito- sum.....	Upper Dev.	4 73
Orthis.....	Carboniferous	97 45	Goniatites intumescens..	Upper Dev.	5 73
Orthis resupinata.....	Carboniferous	96 45	Phacops laciniatus....	Upper Dev.	6 73
Orthis resupinata.....	Carboniferous	98 45	Pterichthys quadratus....	Upper Dev.	7 73
Orthis resupinata.....	Carboniferous	38 73	Spirifer.....	Upper Dev.	8 73
Orthis Michelinia.....	Carboniferous	99 45	Spirifer pellico.....	Upper Dev.	9 73
Pecten granosus.....	Carboniferous	39 73	Spirifer Verneulii.....	Upper Dev.	10 73
Pentremites Derbiensis..	Carboniferous	100 45	Turritella coronata.....	Upper Dev.	11 73
Productus concinnus....	Carboniferous	106 45	Triginotrela osteolata...	Upper Dev.	12 73
Productus gigas.....	Carboniferous	103 45	<b>LOWER DEVONIAN.</b>		
Productus longispina....	Carboniferous	104 45	<b>ROCKS.</b>		
Productus Martini.....	Carboniferous	105 45	Alaunschiefer, schiste alu- minifere.....	Lower Dev.	7 46
Productus Martini.....	Carboniferous	40 73	Devonian limestone....	Lower Dev.	4 46
Productus Martini.....	Carboniferous	109 45	Devonian limestone....	Lower Dev.	5 46
Productus Martini.....	Carboniferous	110 45	Devonian limestone....	Lower Dev.	6 46
Productus Martini.....	Carboniferous	111 45	Old red sandstone.....	Lower Dev.	2 46
Productus, in mountain limestone.....	Carboniferous	108 45	Old red sandstone.....	Lower Dev.	3 46
Productus, in mountain limestone.....	Carboniferous	101 45	Sandstone, old red....	Lower Dev.	1 46
Productus, in mountain limestone.....	Carboniferous	102 45	<b>FOSSILS.</b>		
Productus scabriculus....	Carboniferous	107 45	Brontes politer.....	Lower Dev.	8 46
Spirifer.....	Carboniferous	119 45	Calceola sandalina.....	Lower Dev.	13 74
Spirifer.....	Carboniferous	113 45	Calceola sandalina.....	Lower Dev.	9 46
Spirifer.....	Carboniferous	114 45	Cocosteus.....	Lower Dev.	15 74
Spirifer.....	Carboniferous	115 45	Cocosteus latus?.....	Lower Dev.	10 46
Spirifer.....	Carboniferous	116 45	Clymenia levigata.....	Lower Dev.	14 74
Spirifer.....	Carboniferous	125 46	Favosites spongitæ.....	Lower Dev.	11 46
Spirifer attenuata.....	Carboniferous	112 45	Fenestella antiqua.....	Lower Dev.	16 74
Spirifer distans.....	Carboniferous	122 45	Homalonetes delphinoce- phalus.....	Lower Dev.	17 74
			Macrocheilus arcuatus....	Lower Dev.	18 74
			Megalodon cucullatus....	Lower Dev.	19 74

LOWER DEVONIAN— continued.		No. of the Specimen.	Page.	UPPER SILURIAN— continued.		No. of the Specimen.	Page.
<i>Orthis desquamata</i> .....	Lower Dev.	12	46	<i>Atrypa galeata</i> .....	Upper Silurian	2	74
<i>Orthis</i> .....	Lower Dev.	13	46	<i>Atrypa terebratula</i> .....	Upper Silurian	3	74
<i>Osteolepis</i> .....	Lower Dev.	20	74	<i>Aulopora serpens</i> .....	Upper Silurian	23	48
<i>Osteolepis</i> .....	Lower Dev.	21	74	<i>Calymene Blumenbachii</i> .....	Upper Silurian	6	75
<i>Osteolepis major</i> .....	Lower Dev.	22	74	<i>Calymene Blumenbachii</i> .....	Upper Silurian	25	48
<i>Phacops macrophthalmus</i> ..	Lower Dev.	23	74	<i>Calymene Blumenbachii</i> .....	Upper Silurian	26	48
<i>Spirifer Archiaci</i> .....	Lower Dev.	24	74	<i>Catenipora escharoides</i> ..	Upper Silurian	27	48
<i>Spirifer canaliculatus</i> .....	Lower Dev.	15	46	<i>Calamopora spongitis</i> .....	Upper Silurian	4	74
<i>Spirifer ostiolatus</i> .....	Lower Dev.	25	74	<i>Cellepora, Madrepora, Re-</i>			
<i>Spirifer Verneulli</i> .....	Lower Dev.	16	46	<i>tipora</i> .....	Upper Silurian	5	74
<i>Spirifer</i> ?.....	Lower Dev.	14	46	<i>Corals</i> .....	Upper Silurian	8	75
<i>Strigoccephalus Burtini</i> ..	Lower Dev.	26	74	<i>Corals from Dudley</i> ....	Upper Silurian	7	75
<i>Strigoccephalus Burtini</i> ..	Lower Dev.	27	74	<i>Cyathophyllum dianthus</i> ..	Upper Silurian	29	48
<i>Terebratula asper</i> .....	Lower Dev.	28	74	<i>Cyclolites peracutus</i> .....	Upper Silurian	30	48
<i>Terebratula asper</i> .....	Lower Dev.	17	46	<i>Cyathocrinus rugosus</i> .....	Upper Silurian	28	48
<i>Terebratula concentrica</i> ...	Lower Dev.	18	46	<i>Cystiphyllum Siluriense</i> ..	Upper Silurian	9	75
<i>Terebratula, Devonian</i> ..	Lower Dev.	29	74	<i>Euomphalus</i> .....	Upper Silurian	31	48
<i>Terebratula ferita</i> and <i>Spi-</i>		30	74	<i>Euomphalus funatus</i> ....	Upper Silurian	10	75
<i>rifer heteroclytus</i> .....	Lower Dev.	20	46	<i>Euomphalus funatus</i> ....	Upper Silurian	11	75
<i>Terebratula pugnus</i> .....	Lower Dev.	31	74	<i>Euomphalus rugosus</i> ....	Upper Silurian	32	48
<i>Terebratula reticularis, var.</i>	Lower Dev.	19	46	<i>Favosites Gothlandicus</i> ..	Upper Silurian	33	48
		32	74	<i>Favosites ramosa</i> .....	Upper Silurian	34	48
				<i>Graptolites levigatus</i> ....	Upper Silurian	12	75
				<i>Gryphaea globosa (ostrea)</i> ..	Upper Silurian	13	75
				<i>Leptaena englypha</i> .....	Upper Silurian	36	48
				<i>Leptaena englypha</i> .....	Upper Silurian	37	48
				<i>Leptaena englypha</i> .....	Upper Silurian	38	48
				<i>Leptaena funiculosa</i> ....	Upper Silurian	40	48
				<i>Leptaena rugosa</i> .....	Upper Silurian	39	48
				<i>Leptaena transversalis</i> ...	Upper Silurian	41	48
				<i>Limuria clathrata, Lons-</i>			
				<i>dale</i> .....	Upper Silurian	35	48
				<i>Madrepora</i> .....	Upper Silurian	5	74
				<i>Olenus gibbosus</i> .....	Upper Silurian	42	48
				<i>Orthis biloba</i> .....	Upper Silurian	44	48
				<i>Orthis elegantula</i> .....	Upper Silurian	45	48
				<i>Orthis hybrida</i> .....	Upper Silurian	14	75
				<i>Orthis hybrida</i> .....	Upper Silurian	43	48
				<i>Orthis rigida, Sow.</i> ....	Upper Silurian	46	48
				<i>Pentamerus galeatus</i> ....	Upper Silurian	47	48
				<i>Pentamerus Knightii</i> ....	Upper Silurian	17	75
				<i>Pentamerus Knightii</i> ....	Upper Silurian	15	75
				<i>Pentamerus Knightii</i> ....	Upper Silurian	48	48
				<i>Pentamerus Knightii</i> ....	Upper Silurian	49	48
				<i>Pentamerus laevis</i> .....	Upper Silurian	64	49
				<i>Phacops caudatus</i> .....	Upper Silurian	16	75
				<i>Porites (a coral)</i> .....	Upper Silurian	53	48
				<i>Porites pyriformis</i> .....	Upper Silurian	50	48
				<i>Porites pyriformis</i> .....	Upper Silurian	51	48
				<i>Porites inordinata</i> .....	Upper Silurian	52	48
				<i>Reipora</i> .....	Upper Silurian	5	74
				<i>Spirifer biloba</i> .....	Upper Silurian	19	75
				<i>Spirifer radiatus</i> ....	Upper Silurian	54	48
				<i>Stromatopora concentrica</i> ..	Upper Silurian	55	49
				<i>Stromatopora concentrica</i> ..	Upper Silurian	18	75
				<i>Terebratula affinis</i> .....	Upper Silurian	56	49
N. Silurian Group.							
ROCKS.							
<i>Greywacke</i> .....	Silurian	2	47				
<i>Greywacke</i> .....	Silurian	3	47				
<i>Greywacke</i> .....	Silurian	4	47				
<i>Greywacke</i> .....	Silurian	7	47				
<i>Greywacke</i> .....	Silurian	8	47				
<i>Greywacke</i> .....	Silurian	10	47				
<i>Greywacke</i> .....	Silurian	11	47				
<i>Greywacke</i> .....	Silurian	12	47				
<i>Greywacke</i> .....	Silurian	13	47				
<i>Greywacke</i> .....	Silurian	16	47				
<i>Greywacke conglomerate</i> ..	Silurian	1	47				
<i>Greywacke sandstone</i> ....	Silurian	14	47				
<i>Greywacke slate</i> .....	Silurian	15	47				
<i>Greywacke slate</i> .....	Silurian	9	47				
<i>Greywacke slate</i> .....	Silurian	5	47				
<i>Greywacke of Werner</i> ....	Silurian	6	47				
<i>Silurian limestone</i> .....	Silurian	21	47				
<i>Silurian limestone</i> .....	Silurian	22	47				
<i>Silurian sandstone</i> .....	Silurian	1	74				
<i>Transition limestone</i> ....	Silurian	17	47				
<i>Transition limestone</i> ....	Silurian	18	47				
<i>Transition limestone</i> ....	Silurian	19	47				
<i>Transition limestone</i> ....	Silurian	20	47				
UPPER SILURIAN.							
FOSSILS.							
<i>Agnostus pisiformis</i> .....	Upper Silurian	24	48				

UPPER SILURIAN— <i>continued.</i>		No. of the Specimen	Page.	LOWER SILURIAN— <i>continued.</i>		No. of the Specimen.	Page.
<i>Terebratula imbricata</i> . . .	Upper Silurian	57	49	<i>Graptolites foliaceus</i> . . .	Lower Silurian	61	49
<i>Terebratula reticularis</i> . . .	Upper Silurian	21	75	<i>Ogygia Buchii</i> . . . . .	Lower Silurian	27	75
<i>Terebratula sublepidota</i> . . .	Upper Silurian	20	75	<i>Orthis</i> . . . . .	Lower Silurian	63	49
Trilobite, head of . . . . .	Upper Silurian	58	49	<i>Orthis bifuratus</i> . . . . .	Lower Silurian	28	75
LOWER SILURIAN.				<i>Orthis calligramma</i> . . . .	Lower Silurian	62	49
<i>Agnostus pisiformis</i> . . . .	Lower Silurian	22	75	<i>Pentamerus lævis</i> . . . . .	Lower Silurian	64	49
<i>Asaphus Budin</i> . . . . .	Lower Silurian	59	49	<i>Sphaerorites aurantium</i> . .	Lower Silurian	65	49
<i>Asaphus expansus</i> . . . . .	Lower Silurian	23	75	<b>O. Cambrian Group.</b>			
<i>Asaphus raniceps</i> . . . . .	Lower Silurian	24	75	<i>Thonschieferkalk</i> . . . . .	Cambrian	66	49
<i>Atrypa galeata</i> . . . . .	Lower Silurian	25	75	<i>Thonschiefer</i> , newer . . .	Cambrian	67	49
<i>Graptolites</i> . . . . .	Lower Silurian	26	75	<i>Thonschiefer</i> , older . . . .	Cambrian	68	49
<i>Graptolites</i> . . . . .	Lower Silurian	60	49				





## PART II.

## DESCRIPTIVE GEOLOGY.

## AQUEOUS ROCKS.

## POST TERTIARY.

### A. POST PLIOCENE GROUP.

<i>Periods and Groups.</i>	<i>Examples.</i>	<i>Observations.</i>
1. Recent.....	Peat mosses and shell-marl, with bones of land animals, human remains and works of art..... Newer parts of modern deltas and coral reefs.....	All the imbedded shells, freshwater, and marine, of living species, with occasional human remains and works of art.
2. Post Pliocene....	Clay, marl, and volcanic tuff of Ischia, p. 113..... Loess of the Rhine, p. 117..... Newer part of boulder formation, with erratics, p. 148.....	All the shells of living species. No human remains or works of art. Bones of quadrupeds, partly of extinct species.

**NONE.**

## I. TERTIARY.

## B. PLIOCENE GROUP.

<i>Periods and Groups.</i>	<i>Examples.</i>	<i>Observations.</i>
3. <b>Newer Pliocene or Pleistocene.</b>	<p>Boulder formation or drift of northern Europe and North America, chaps. 11 and 12.....</p> <p>Cavea deposits and osseous breccias. p. 153.....</p> <p>Fluvio-marine oreg of Norwich, p. 148.....</p> <p>Limestone of Girgenti, in Sicily, p. 152.....</p>	<p>Three-fourths of the fossil shells of existing species.</p> <p>A majority of the mammalia extinct but the genera corresponding with those now surviving in the same great geographical and zoological provinces. 157.</p> <p>During part of this period icebergs frequent in the seas of the northern hemisphere, and glaciers on hills of moderate height.</p>

No.

1. APORRHAIAS PES-PUBLICANI. PLIOCENE, *Norfolk.*
  2. ASTARTE BORREALIS. PLIOCENE, *Sweden.*
  3. NUCULA. PLIOCENE, *Portland, Maine.*
  4. NUCULA PORTLANDICA. PLIOCENE, *Portland, Maine.*
  5. SANGUINOLARIA FUSCA. PLIOCENE, *Portland, Maine.*
  6. UNIO PICTURUM, MAMMALIAN DEPOSITS, *Valley of Thames.*
  7. VENUS CHIONE. PLIOCENE, *Astigiani.*
- 
4. Older Pliocene.. { Red and Coralline crag of Suffolk,  
                              P. 163..... } A third or more of the species of  
                              Subapennine beds, 160..... } Mollusca extinct.  
  } Nearly, if not all, the mammalia  
  } extinct.
8. FUSUS CONTRARIUS, CRAG, *Suffolk.*
  9. FUSUS SCALARIFORMIS, PLIOCENE, *Sweden.*

**C. MIOCENE GROUP.***Periods and Groups.**Examples.**Observations.*

5. Miocene.....	{	Faluns of Touraine, p. 168.....	}	About two-thirds of the species of shells extinct.
		Part of Bourdeaux beds, p. 171.....		The recent species of shells often not found in the adjoining seas, but in warmer latitudes.
		Part of Molasse of Switzerland, p. 171..		All the mammalia extinct.

**No.**

1. CANCELLARIA ACUTANGULA? MIOCENE, *Bourdeaux.*
2. CYRENA SUBURATA. MIOCENE.
3. CYTHEREA. MIOCENE, *Bourdeaux.*
4. FUSUS BURDIGALENSIS. MIOCENE. *Bourdeaux.*
5. NATICA VARIABILIS. MIOCENE.
6. PECTUNCULUS. MIOCENE, *Bourdeaux.*
7. SPONDYLUS. MIOCENE, *Astigiani.*
8. STROMBUS ITALICUS. BONELLI. MIOCENE? *Montapa.*
9. TURRITELLA TEREBRATIS. MIOCENE, *Bourdeaux.*

**D. EOCENE GROUP.***Periods and Groups.**Examples.**Observations.*

6. Upper Eocene...	{	Upper marine of Paris basin, Fontainebleau sandstone, p. 175.....	}	Fossil shells of the Eocene period, with very few exceptions, extinct.
		Upper freshwater and millstone of same.		Those which are identified with living species rarely belong to neighbouring regions.
		Kleyn Spawen beds, p. 176.....		All the mammalia of extinct species, and the greater part of them of extinct genera.
		Hermendorf tile-clay, near Berlin..		Plants of Upper Eocene, indicating a south European or Mediterranean climate; those of Lower Eocene, a tropical climate.
		Mayence tertiary strata, p. 177 .....		
		Freshwater beds of Limagne d' Auvergne, p. 181.....		

1. TERTIARY LIMESTONE. *Brunn near Vienna.*
2. CALYPTRÆA TROCHIFORME. EOCENE, *Southampton.*
3. CARDITA ACUTICOSTA. EOCENE, *Paris.*
4. CASSIDULUS. ? EOCENE, *Normandy.*
5. FUSUS BULBIFORMIS. EOCENE, *Paris basin.*
6. HELIX VECTENSIS. UPPER EOCENE, *Isle of Wight.*
7. HIPPOTherium GRACILE. TEETH OF: *Eppelsheim near Mayence.*

7. Middle Eocene..	{	Paris gypsum with Paleotherium, &c. p. 191.....	}	Fossil shells of the Eocene period, with very few exceptions, extinct.
		Freshwater and fluvi-marine beds, of Headen Hill, Isle of Wight, p. 197...		Those which are identified with living species rarely belong to neighbouring regions.
		Barton beds, Hants, p. 198.....		All the mammalia of extinct species, and the greater part of them of extinct genera.
		Calcaire Grossier, Paris, p. 193.....		Plants of Upper Eocene, indicating a south European or Mediterranean climate; those of Lower Eocene, a tropical climate.
		Bagshot and Bracklesham beds, Surrey and Sussex, p. 198.....		

8. ACTÆON SIMULUTUS, EOCENE, *Barton.*

No.

9. ANOMIA STRIATA. EOCENE, *Bracklesham*.
10. BALANUS ERISMA. EOCENE, *Isle of Wight*.
11. BUCCINUM CANALICULATUM (FUSUS,) EOCENE, *Barton*.
12. BULIMUS ELLIPTICUS. EOCENE, *Isle of Wight*.
13. CALYPTREA TROCHIFORME. EOCENE, *Barton*.
14. CHAMA SQUAMOSA. EOCENE, *Barton*.
15. CANCER TUBERCULATUS. EOCENE, *Isle of Wight*.
16. CANCELLARIA. EOCENE, *Isle of Wight*.
17. CARDIUM SEMI-GRANULOSUM. EOCENE, *Bracklesham-bay*.
18. CERITHIUM CINCTUM. EOCENE, Upper marine, *Headon-hill, Isle of Wight*.
19. CERITHIUM CONCAVUM. EOCENE, Upper freshwater, East end of *Colwell-bay, Isle of Wight*.
20. CERITHIUM MARGARITACEUM. EOCENE, Upper marine, *Colwell-bay, Isle of Wight*.
21. CORBULA LONGIROSTRUM. EOCENE, *Barton*.
22. CASSIDARIA STRIATA. EOCENE, *Barton*.
23. CRAB.
24. CRAB, FOSSIL. *Sheppey*.
25. CRAB. *Sheppey*.
26. CRAB, *Sheppey*.
27. CRAB, *Sheppey*.
28. CYCLOTUS CINCTUS. EOCENE, *Isle of Wight*.
29. CYRENA OBOVATA. EOCENE, *Isle of Wight*.
30. CYTHEREA INCRASSATA. MIDDLE EOCENE, *Isle of Wight*.
31. EUOMPHALUS DISCUS. UPPER EOCENE, *Isle of Wight*.
32. FRESHWATER LIMESTONE, *Isle of Wight*.
33. FUSUS ACICULATUS. EOCENE, *Barton*.
34. FUSUS LABIATUS. EOCENE, Upper marine, *Colwell-bay, Isle of Wight*.
35. FUSUS LONGÆVUS (VERMILIA CRASSA), London Clay, *Barton*.
36. FUSUS MACILENTUS. EOCENE, *Barton*.
37. FUSUS REGULARIS. SOW : EOCENE, *Barton*.
38. FUSUS ROSTRATUS. EOCENE, *Barton*.
39. LIMNEA GLOBOSULA. EOCENE, *Isle of Wight*.
40. LIMNEA LONGISCATA. EOCENE, *Isle of Wight*.
41. LIMNEA PYRAMIDALIS. EOCENE, *Isle of Wight*.
42. MELANIA LACTEA. EOCENE.
43. MELANOPSIS CARINATUS. EOCENE, *Isle of Wight*.
44. MELANOPSIS FUSIFORMIS. EOCENE, Upper marine, *Headon-hill, Isle of Wight*.

No.

45. *NATICA MUTABILIS*. EOCENE, Upper marine, *Colwell-bay, Isle of Wight*.
46. *NEMATURA PYGMEA*. EOCENE, *Isle of Wight*.
47. *NEMATURA NERITINA*. MIDDLE EOCENE, *Isle of Wight*.
48. *NERITINA CONCAVA*. EOCENE, *Isle of Wight*.
49. *NUCULA DESHAYESII*. EOCENE, *Belgium*.
50. *NUMMULITES LAVIGATA*. EOCENE, *Belgium*.
51. *OSTREA*. MIDDLE EOCENE, *Colwell-bay, Isle of Wight*.
52. *OSTREA TENER*. EOCENE, *Isle of Wight*.
53. *OLIVA BRANDERI*. EOCENE, *Barton*.
54. *PALUDINA LENTA*. EOCENE, *Colwell bay, Isle of Wight*.
55. *PALUDINA THERMALIS*. Freshwater Limestone, *Hochst near Frankfort*.
56. *PHOLADOMYA MARGARITACEA*. EOCENE, *Isle of Wight*.
57. *PHOLADOMYA MARGARITACEA*, London Clay, *Isle of Wight*.
58. *PLANORBIS EUOMPHALUS*. EOCENE, *Isle of Wight*.
59. *PLANORBIS ROTUNDATUS*. EOCENE, *Isle of Wight*.
60. *PLANORBIS ROTUNDATUS*. EOCENE, *Isle of Wight*.
61. *PLEUROTOMA ATTENUATA*. EOCENE, *Bracklesham*.
62. *PLEUROTOMA FILOSA*. EOCENE.
63. *POTAMIDES*. EOCENE, *Isle of Wight*.
64. *POTAMIDES MURICATUS*. EOCENE, Upper Marine, *Headon-hill, Isle of Wight*.
65. *POTAMIDES VENTRICOSUS*. SOW : EOCENE. Upper Marine. *Headon-hill. Isle of Wight*.
66. *POTAMOMYA PLANA*. EOCENE, *Isle of Wight*.
67. *PSAMMOBIA COMPRESSA* ? EOCENE, *Isle of Wight*.
68. *PSAMMOBIA RUGOSA*. EOCENE, *Isle of Wight*.
69. *PSAMMOBIA RUDIS*. SOW : MIDDLE EOCENE, *Isle of Wight*.
70. *ROSTELLARIA FISSINELLA*. EOCENE.
71. *ROSTELLARIA RIMOSA*. EOCENE, *Barton*.
72. *SANGUINOLARIA HOLLOWAYSII* EOCENE, *Bracklesham*.
73. *SERAPHS CONVOLUTUS*. SOW : EOCENE, *Barton*.
74. *STROMBUS BARTONENSIS*. EOCENE, *Barton*.
75. *TRITON ARGUTUS*. SOW : EOCENE, *Barton*.
76. *TRITON FLANDRICUM*. EOCENE, *Belgium*.
77. *TROCHUS MONILIFER*. EOCENE, *Barton*.
78. *TURRITELLA IMBRICATANA*. EOCENE, *Isle of Wight*.
79. *TURRITELLA TERREBELL*. EOCENE, *Bracklesham Bay*.
80. *UNIO SOLANDRI*. EOCENE, *Isle of Wight*.
81. *VOLUTA AMBIGUA*. EOCENE, *Barton*.

No.

82. VOLUTA LUCTATOR. EOCENE, *Barton*.  
 83. VOLUTA LIMA. EOCENE, *Barton*.  
 84. VOLUTA SPINOSA. EOCENE.  
 85. VENERICARDIA (CARDITA) GLOBOSA. EOCENE, *Barton*.  
 86. VENUS TENUISTRIATA. EOCENE, *Barton*.

8. Lower Eocene..	{	London clay proper of Highgate Hill and Sheppey,—Bognor beds, Sussex, p. 200.....	}	Fossil shells of the Eocene period, with very few exceptions, extinct.
		Sables inférieurs, and lits coquilliers of Paris basin, p. 196.....		Those which are identified with living species rarely belong to neighbouring regions.
		Mottled and plastic clays and sands of the Hampshire and London basins, p. 203.....		All the mammalia of extinct species, and the greater part of them of extinct genera.
		Sables inférieurs, and argiles plastiques of Paris basin, p. 196.....		Plants of Upper Eocene, indicating a south European or Mediterranean climate; those of Lower Eocene, a tropical climate.
		Nummulitic formation of the Alps, p. 205.....		

87. CASSIDARIA CARINATA. EOCENE, *Highgate*.  
 88. CRRITHIUM. Plastic clay, LOWER EOCENE, *France*.  
 89. CYRENA CUNEIFORMIS. EOCENE, *Woolwich*.  
 90. FOSSIL RESIN. EOCENE, *Highgate*.  
 91. FUSUS. EOCENE, *Highgate*.  
 92. MELANIA INQUINATA. EOCENE, Plastic clay, *Woolwich*.  
 93. MELANOPSIS BUCCINOIDES. CYRENA TELLINELLA. COTTON. Plastic clay, *Woolwich*.  
 94. MODIOLA ELEGANS. EOCENE, *Highgate*.  
 95. MUREX ASPER. EOCENE, *Highgate*.  
 96. NAUTILUS CENTRALIS. EOCENE, *Highgate*.  
 97. NAUTILUS REGALIS. London clay, *Highgate*.  
 98. NUMMULITES LEVIGATA. EOCENE, *France*.  
 99. OTODUS OBLIQUUS (tooth of.), London clay, *Sheppey*.  
 100. OSTREA PULCHRA. LOWER EOCENE, Plastic clay, *Woolwich, Kent*.  
 101. PECTUNCULUS BREVIROSTRUM. EOCENE, *Bognor*.  
 102. PETROPHYLLOIDES RICHARDSONI. EOCENE, *Kent*.  
 103. ROSTELLARIA MACROPTERA. London clay, *Kingston*.  
 104. TEREDO ANTENNAUTA. SOW: EOCENE, *Highgate*.  
 105. THRACIA OBLATA. EOCENE, *Herne Bay*.  
 106. PINNA AFFINIS. SOW: EOCENE, London clay, *Bognor*.  
 107. VERMETUS BOGNORIENSIS. London clay, *Bognor*.  
 108. VOLUTA NODOSA. EOCENE, *Highgate*.  
 109. VOLUTA WETHERELLI (rare). EOCENE, *Highgate*.

## AQUEOUS ROCKS.

## II. SECONDARY.

## E. CRETACEOUS.

## § UPPER CRETACEOUS.

<i>Periods and Groups.</i>	<i>Examples.</i>	<i>Observations.</i>
9 Maastricht beds..	{ Yellowish white limestone of Maastricht, p. 209..... Coralline limestone of Faxø, Denmark, p. 210..... }	Ammonite, Baculite, and Belemnite, associated with <i>Cypræa</i> , <i>Oliva</i> , <i>Mitra</i> , <i>Trochus</i> &c. Large marine saurians.
10 Upper White Chalk.....	{ White chalk with flints of North and South Downs,—Surrey and Sussex, p. 211..... }	Marine limestone formed in part of decomposed corals.
11 Lower White Chalk.....	{ Chalk without flints, and chalk marl, <i>ibid</i> ..... }	
12 Upper Greensand	{ Loose sand, with bright green particles, <i>ibid</i> ..... Firestone of Merstham, Kent, p. 218.... Marlstone, with layers of chert, south of Isle of Wight..... }	
13 Gault.... .	{ Dark blue marl at base of chalk escarpment,—Kent and Sussex, p. 218..... }	Numerous extinct genera of conchiferous cephalopoda Hamite, Scaphite, Ammonite, &c.

## §§ LOWER CRETACEOUS.

14 Lower Greensand	{ Sand with green matter,—Weald of Kent of Sussex, p. 219..... White, yellowish, and ferruginous sand, with concretions of limestone and chert,—Atherfield, Isle of Wight.... Limestone called Kentish Red..... }	Species of shells &c. nearly all distinct from those of Upper Cretaceous; most of the genera the same.
--------------------	---	--

9 Maastricht beds..	{ Yellowish white limestone of Maastricht, p. 209..... Coralline limestone of Faxø, Denmark, p. 210..... }	Ammonite, Baculite, and Belemnite, associated with <i>Cypræa</i> , <i>Oliva</i> , <i>Mitra</i> , <i>Trochus</i> &c. Large marine saurians.
---------------------	---	--

No.

1. *DITRUPA*. Chalk, *Maastricht*.
2. *OSTREA*. Chalk, *Maastricht*.
3. *PAGURUS FAUJASII*, DESMAREST. Chalk marl, (*Hanover*) and *Maastricht*.

10 Upper White Chalk.....	{ White chalk with flints of North and South Downs,—Surrey and Sussex, p. 211..... }	Marine limestone formed in part of decomposed corals.
---------------------------	--	---

4. *ANANCHYTES OVATUS*. Chalk, *Kent*.
5. *ANANCHYTES OVATUS*. Upper Chalk, *Kent*.
6. *BACULITES FAUJASII*. Upper Chalk, *Normandy*.
7. *BELEMNITES MUCRONATUS*. Upper Chalk, *Norfolk*.
8. *CIDARIS CLAVIGERA*. Chalk, *Bromley*.
9. *CIDARIS VESICULOSA*. Upper Chalk, *Kent*.

No.

10. CIDARIS VESICULOSA. Upper Chalk, *Kent*.
11. CIDARIS VESICULOSA. Chalk, *Kent*.
12. CONULUS VULGARIS. Chalk, *Kent*.
13. CONULUS SUBROTUNDUS. Chalk, *Kent*.
14. CONULUS SUBROTUNDUS. Upper Chalk, *Kent*.
15. CYPHOSOMA MILLERI. Upper Chalk, *Kent*.
16. HOLASTER PILULA. Chalk, *Sussex*.
17. INOCERAMUS BRONGNIARTII. Chalk, *Sussex*.
18. INOCERAMUS CUVIERI. Upper Chalk, *Kent*.
19. INOCERAMUS. Chalk, *Kent*.
20. MILLEPORA CORYMBOSA. *Caen*.
21. MILLEPORA GLOBULARIS. Chalk, *Kent*.
22. MICRASTER COR-ANGUINUM. Chalk, *Kent*.
23. MICRASTER ROSTRATUS VAR : OF S. COR-ANGUINUM. Chalk, *Kent*.
24. OSTREA SEMIPLANA. Chalk, *Norfolk*.
25. PECTEN 5 COSTATUS. Upper Chalk, *Kent*.
26. PECTEN MEMBRANACEUS, Niln, Mont. ST. PIERRE, (rare) terre  
crétace.
27. PTYCHODUS LATIOR OR ALTIOR. Chalk, *Kent*.
28. SERPULA MACROPUS. Chalk, *Kent*.
29. SERPULA. CIPLY near Mons, Chalk.
30. SERPULA. CIPLY near Mons, Chalk.
31. SPONDYLUS SPINOSUS. Upper Chalk. *Sussex*.
32. SPONDYLUS SPINOSUS (PLAGIOSTOMA). Upper Chalk.
33. SPONDYLUS. Upper Chalk.
34. SPONDYLUS. Upper Chalk.
35. TEREBRATULA CARNEA. Sow : Upper Chalk, *Kent*.
36. TEREBRATULA CARNEA. Chalk.
37. TEREBRATULA NERVIENSIS. Chloritic Chalk, *Tournay, Belgium*.
38. TEREBRATULA Plicatulus. Upper Chalk, *Kent*.
39. TEREBRATULA SEMIGLOBOSA. Chalk, *Kent*.
40. TEREBRATULA SEMIGLOBOSA. Chalk, *Mendon Paris*.
41. VENTRICULITES. Chalk, *Kent*.
42. VENTRICULITES, IN FLINT. Upper Chalk, *Kent*.
43. VENTRICULITES SIMPLEX. Middle Chalk.

---

11 Lower White { Chalk without flints, and chalk marl, }  
Chalk..... { Surrey and Sussex, p. 211..... }

44. BELEMNITES LANCEOLATUS. Lower Chalk.
45. BELEMNITES DILATATUS. Lower Chalk, *Castellano (Basses Alpes)*.



No.

46. *BERYX ORNATUS*. Lower Chalk, *Kent*.
47. *DISCOIDEA SUBUCULUS*. Chalk Marl, *Hessia*.
48. FISH, HEAD OF. Lower Chalk, *Cambridge*.
49. *GALERITES VULGARIS*. Chalk, *Kent*.
50. *HOLASTER PLANUS*. (*SPATANGUS*). Lower Chalk, *Kent*.
51. *HOLASTER SUBGLOBOSA*. (*SPATANGUS*). Lower Chalk, *Wiltshire*.
52. *INOCERAMUS ANNULATUS*. Lower Chalk, *Kent*.
53. *INOCERAMUS PLANUS*. Lower Chalk.
54. *OSTREA*. Lower Chalk, *Sussex*.
55. *PECTEN BEAVERI*. Lower Chalk, *Kent*.
56. *PECTEN LAMINOSUS*. Lower Chalk, *Sussex*.
57. *PLICATULA PECTINOIDES*. Lower Chalk, *Kent*.
58. *SERPULA HELICIFORMIS*. Chalk Marl, *Hessia*.
59. *SCAPHITES EQUALIS*. Lower Chalk.
60. *SPHÆRULITES*. Cretaceous, *Lisbon*.
61. *TREBRATULA SUBUNDATA*. Lower Chalk, *Dorsetshire*.
62. *TREBRATULA SEMIGLOBOSA*. Lower Chalk, *Wiltshire* and *Kent*.
63. *TURRILITES*. Lower Chalk, *Wiltshire*.
64. *VENTRICULITES*. Lower Chalk, *Kent*.

---

12 Upper Greensand { Loose sand, with bright green particles,  
Surrey and Sussex, p. 211..... }  
                              { Firestone of Merstham, Kent, p. 218.... }  
                              { Marlstone, with layers of chert, south }  
                              { of Isle of Wight..... }

65. *ACHILLEUM VOLUTA*. Alpine formation.
66. *AMMONITES VARICOSUS*. Greensand, *Blackdown*.
67. *AMMONITES VARICOSUS*. Greensand, *Blackdown*.
68. *CUCULLEA CARINATA*. Upper Greensand, *Blackdown*, *Devonshire*.
69. *CYPRINA ANGULATA*. Upper Greensand, *Devizes*, *Wiltshire*.
70. *CYPRINA ANGULATA*. Greensand, *Blackdown*.
71. *DISCOIDIA SUBUCULUS*. Upper Greensand, *Warminster*.
72. *EXOGYRA CONICA*. Upper Greensand.
73. *INOCERAMUS CONCENTRICUS*. Upper Greensand, *Blackdown*, *Devon*.
74. *PECTEN QUADRICOSTATUS*. Upper Greensand, *Blackdown*.
75. *PECTUNCULUS UMBONATUS*. Upper Greensand, *Blackdown*, *Devon*.
76. *SIPHONIA PYRIFORMIS*. Greensand, *Blackdown*.
77. *SPATANGUS CURVIATUS*. *Heiligenstadt*.
78. SPONGES.
79. SPONGES. Greensand, *Farringdon*.

No.

80. SPONGES. *Farringdon*.  
 81. VERMICULARIA CONCAVA. Upper Greensand.  
 82. VENUS CAPERATA. SOW: Greensand, *Blackdown*.

---

13 Gault..... { Dark blue marl at base of chalk escarp- } Numerous extinct genera of conchi-  
 ment,—Kent and Sussex, p. 218. .... } ferous cephalopoda. Hamite, Sea-  
 phite, Ammonite, &c.

83. AMMONITES INFLATUS VAR: Gault, *Cambridge*.  
 84. AMMONITES BEUDANTII. Gault, *Escragmolles*.  
 85. AMMONITES SERRATUS. Gault, *Folkstone*.  
 86. AVICULA GRYPHÆOIDES. Gault, *Cambridge*.  
 87. DENTALIUM ELLIPTICUM. Gault, *Cambridge*.  
 88. HAMITES MAXIMUS. Gault, *Folkstone*.  
 89. INOCERAMUS CONCENTRICUS. Gault, *Kent*.  
 90. INOCERAMUS SULCATUS, SOW: Gault, *Kent*, *Folkstone*.  
 91. PLICATULA PECTINOIDES. Gault, *Cambridge*.  
 92. SOLARIUM ——— ? Gault, *Cambridge*.  
 93. SOLARIUM ORNATUM. Gault, *Cambridge*.  
 94. TEREBRATULA BIPPLICATA. Gault, *Cambridge*.  
 95. TEREBRATULA SULCATA. Park Gault, *Cambridge*.  
 96. TEREBRATULA OBTUSA. SOW: Gault, *Cambridge*.  
 97. TROCHOCYATHUS. Gault, *Cambridge*.  
 98. TROCHOCYATHUS. Gault, *Cambridge*.

---

14 Lower Greensand { Sand with green matter,—Weald of } Species of shells &c. nearly all dis-  
 Kent and Sussex, p. 219. .... } tinct from those of Upper Creta-  
 White, yellowish, and ferruginous sand, } ceous; most of the genera the  
 with concretions of limestone and } same.  
 chert,—Atherfield, Isle of Wight....  
 Limestone called Kentish Red. .... }

## ROCKS.

99. CYCLAS LIMESTONE. *Rostenblat* near *Toplitz*.  
 100. FERRUGINOUS SAND. *Hampstead*.  
 101. GREENSAND. (IRON SAND) from the *Cave Farnham*.  
 102. GREENSAND WITH FOSSILS.  
 103. MARLS. *Southward*, *Essex*.  
 104. WHITBY SANDS. *Isle of Wight*.

## FOSSILS.

105. ARCA RAULINI. Lower Greensand, *Isle of Wight*.  
 106. ASTACUS VECTENSIS. Lower Greensand, *Isle of Wight*.  
 107. ASTACUS VECTENSIS. Lower Greensand, *Isle of Wight*.

## No.

108. *PANOPŒA PLICATA*. Lower Greensand, *Isle of Wight*.  
 109. *TURRITELLA* &C. Lower Greensand, *Isle of Wight*.  
 110. *GERVILLIA AVICULOIDES*. Lower Greensand.  
 111. *GERVILLIA AVICULOIDES*. (*TURRITELLA GRANULATA*) Greensand,  
*Blackdown*.  
 112. *GERVILLIA LINGULOIDES*. Lower Greensand.  
 113. *NAUTILUS UNDULATUS*. Lower Greensand.  
 114. *Pecten INTERSTRIATUS*. Lower Greensand.  
 115. *PANOPŒA PLICATA*. Lower Greensand.  
 116. *SERPULA*. Lower Greensand.  
 117. *TEREBRATULA SELLA*, SOW: Lower Greensand.  
 118. *TEREDINA IN WOOD*. Lower Greensand, *Maidstone*.  
 119. *THETIS MINOR*. Lower Greensand.

## F. WEALDEN.

## Periods and Groups.

## Examples.

## Observations.

- 13 Wealden Clay.... { Clay with occasional bands of lime-  
 stone,—Weald of Kent, Surrey, and  
 Sussex, p. 227... } Of fresh water origin, shells of pal-  
 moniferous mollusca and of *Cypria*.  
 land reptiles.

1. *BUFONITES* (FISH PALATES). Wealden, *Kent*.
2. *CYCLAS MEDIA*. Wealden, *Tonbridge wells*.
3. *CYPRIS VALDENSIS*. Wealden, *Isle of Wight*.
4. *CYPRIS VALDENSIS*. Wealden.
5. *CYPRIS VALDENSIS*. Wealden.
6. *LONCHOPTERIS MANTELLI*. Wealden.
7. *UNIO GAULTERI*. (*CYCLAS MEDIA*). Wealden, *Sussex*.
8. *UNIO GAULTERI* &C. Wealden, *Tonbridge wells*.

## G. OOLITE.

## Periods and Groups.

## Examples.

## Observations.

- 18 Upper Oolite.... { a. Portland building stone, p. 250. ....  
 b. Portland sand. ....  
 c. Kimmeridge clay, Dorsetshire, p. 260.  
 19 Middle Oolite.... { a. Coral Rag, p. 260. Calcareous free-  
 stones, Oolite, often full of Corals.  
 Oxfordshire. ....  
 b. Oxford clay—Dark blue clay—Oxford-  
 shire and midland counties, p. 263. ....  
 20 Lower Oolite . . { a. Cornbrash and forest marble, Wilt-  
 shire, p. 263. ....  
 b. Great Oolite and Stonesfield slate,  
 Bath, Bradford, Stonesfield near  
 Woodstock, Oxfordshire, p. 266. ....  
 c. Fuller's earth,—clay containing ful-  
 ler's earth near Bath, p. 272. ....  
 d. Inferior Oolite, calcareous freestone,  
 and yellow sands,—Cotteswold Hills,  
 Dundry Hill, near Bristol, p. 272. .... }
- Ammonites and Belemnites numer-  
 ous,  
 Large saurians, as *Pterodactyles*,  
*Plesiosaurs*, *Ichthyosaurs*.  
 No cetaceans yet known, but three  
 species of terrestrial mammals, p.  
 267, 268. Preponderance of ganoid  
 fish. The plants chiefly cycads,  
 conifers, and ferns, with a few  
 palms.

No.

13 Upper Oolite. . .	{	a. Portland building stone, p. 259. ....	} Ammonites and Belemnites numerous. Large saurians, as Pterodactyles, Plesiosaurs, Ichthyosaurs. No cetaceans yet known, but three species of terrestrial mammalia, p. 267, 268. Preponderance of ganoid fish. The plants chiefly cycads, conifers, and ferns, with a few palms.
		b. Portland sand. ....	
		c. Kimmeridge clay, Dorsetshire, p. 260. ....	

## ROCKS.

1. IRON OOLITE, *Wurtemberg*.
2. UPPER JURA. Limestone, *Bayreuth*.

## FOSSILS.

3. AMMONITES BIPILEX. OOLITE, *Portland*.
4. AXINUS OBSCURUS, *Kimmeridge Clay*.

10 Middle Oolite. . .	{	a. Coral Rag. p. 260. Calcareous free-stones. Oolite, often full of Corals. Oxfordshire. ....	} Ammonites and Belemnites numerous. Large saurians, as Pterodactyles, Plesiosaurs, Ichthyosaurs. No cetaceans yet known, but three species of terrestrial mammalia, p. 267, 268. Preponderance of ganoid fish. The plants chiefly cycads, conifers, and ferns, with a few palms.
		b. Oxford clay—Dark blue clay—Oxfordshire and midland counties, p. 262. ....	

## a. CORAL RAG.

5. ASTREA LIMBATA. Coral Rag, *Nattheim, Wurtemberg*.
6. ASTARTE OVATA. Coral Rag, *Wiltshire*.
7. CERIOPORA RADICIFORMIS. Coral Rag, *Engelhardtsberg*.
8. CIDARIS BLUMENBACHII. Coral Rag, *Wiltshire*.
9. CIDARIS CRENULARIS. (Hemicidaris,) Coral Rag, *Wiltshire*.
10. CORAL RAG. Malton, *Yorkshire*.
11. LITHODOMUS INCLUSUS. Coral Rag, *Wiltshire*.
12. NUCLEOLITES CLUNICULARIS. Coral Rag, Oolite, *Wiltshire*.
13. PECTEN LEVIS? Sow: Coral Rag.
14. PENTACIMITES PENTAGONALIS, Coral Rag, *Engelhardtsberg, Franconia*.
15. TEREBRATULA BIPPLICATA. Coral Rag, *Streitberg*.
16. PECOPTERIS TENUIS. Oolite Shale, *Yorkshire*.
17. PTEROPHYLLUM COMPTUM. Oolite, *Yorkshire*.
18. PTEROPHYLLUM COMPTUM. Oolite Shale, *Scarborough*.
19. AMMONITES CALLOVIENSIS. Kelloway Rock, *Wiltshire*.
20. TEREBRATULA ORNITHOCEPHALA. Shewing the arms of, Kelloway, Rock, Oolite, *Wiltshire*.

## b. OXFORD CLAY.

21. AMMONITES BRIGHTII. Oxford Clay, *Wiltshire*.
22. AMMONITES COMPTONI. Oxford Clay, *Wiltshire*.
23. AMMONITES COMPTONI. Oxford Clay, *Wiltshire*.
24. AMMONITES ELIZABETHÆ. Oxford Clay, *Wiltshire*.
25. AMMONITES ELIZABETHÆ. Oxford Clay, *Wiltshire*.

No.

26. AMMONITES EXCAVATES. Oxford Clay, *Cambridgeshire*.  
 27. AMMONITES HECTICUS. Oxford Clay, *Franconia*.  
 28. AMMONITES LAMBERT. Oxford Clay, *Lanney, Ardennes*.  
 29. AMMONITES VERTEBRALIS. Oxford Clay, *Scarborough*.  
 30. PANOPŒA GIBBOSA. Oxford Clay.  
 31. ROSTELLARIA. Oxford Clay, *Wiltshire*.

- 32 Lower Oolite.... { a. Cornbrash and forest marble, Wiltshire, p. 243..... } Ammonites and Belemnites numerous.  
                               { b. Great Oolite and Stonesfield slate, Bath, Bradford, Stonesfield near Woodstock, Oxfordshire, p. 268. .... } Large sawians, as *Pterodactyles*, *Flaciosaure*, *Ichthyosaurus*.  
                               { c. Fuller's earth—clay containing fuller's earth near Bath, p. 272..... } No octoceras yet known, but three species of terrestrial mammals, p. 267, 268. Preponderance of gaseous fish. The plants chiefly cycads, conifers, and ferns, with a few palms.  
                               { d. Inferior Oolite, calcareous freestone, and yellow sand,—Cotteswold Hills, Dundry Hill, near Bristol, p. 272..... }

## a. CORNBRASH.

32. NUCLEOLITES DEPRESSUS. Cornbrash, *Wiltshire*.  
 33. OSTREA MARSHII. Cornbrash.  
 34. TEREBRATULA INTERMEDIA. Cornbrash, *Wiltshire*.  
 35. TEREBRATULA LAGENALIS. Cornbrash, *Wiltshire*.  
 36. TEREBRATULA OBOVATA. Cornbrash, *Wiltshire*.

## b. GREAT OOLITE.

37. ASTARTE RHOMBOIDALIS. Great Oolite.  
 38. GERVILLIA ACTUA. Great Oolite, *Collyweston*.  
 39. MODIOLA IMBRICATA. Great Oolite.  
 40. TEREBRATULA INTERMEDIA. BROYZON. Great Oolite, *France*.  
 41. TEREBRATULA MAXILLATA. Great Oolite, *Oxfordshire*.  
 42. TEREBRATULA ORBICULARIS. Great Oolite, *Wiltshire*.

## b. BRADFORD CLAY.

43. APIOCRINUS ROTUNDUS. Bradford Clay, *Wiltshire*.  
 44. OSTREA COSTATUS. Bradford Clay, *Baselliers by Belfort*.  
 45. TEREBRATULA COARCTATA. Bradford Clay, *Wiltshire*.

## c. FULLERS EARTH.

46. TEREBRATULA ORNITHOCEPHALA. Fullers Earth, *Wiltshire*.  
 47. TEREBRATULA ORNITHOCEPHALA. Fullers Earth, *Wiltshire*.  
 48. TEREBRATULA VARIANS. Fullers Earth, *Wiltshire*.

## d. INFERIOR OOLITE.

49. AMMONITES PARKINSONI. Inferior Oolite.  
 50. ASTARTE ELEGANS. Inferior Oolite.  
 51. ASTARTE ELEGANS. Inferior Oolite, *Bayeux*.  
 52. ASTARTE MODIOLARIS. Inferior Oolite, *Bridport*.  
 53. BELEMNITE shewing Alveolus. Inferior Oolite.

No.

54. DISCOIDIA HEMISPHERICA. Inferior Oolite.
55. PLEUROTOMARIA ORNATA. Inferior Oolite, *Bridport*.
56. TEREBRATULA ——— ? Inferior Oolite, *Strand*.
57. TEREBRATULA ANGULATA. Inferior Oolite, *Cheltenham*.
58. TEREBRATULA VULLATA. Inferior Oolite, *Pyrenees*.
59. TEREBRATULA CORNUTA. Marlstone, *Ilminster, Somerset*.
60. TEREBRATULA CYNOCEPHALA. Inferior Oolite, *Gloucestershire*.
61. TEREBRATULA FIMBRIA. Inferior Oolite, *Gloucestershire*.
62. TEREBRATULA PEROVALIS. Inferior Oolite, *Cheltenham*.
63. TEREBRATULA SPINOSA. Inferior Oolite, near *Bath*.
64. TEREBRATULA SPHEROIDALIS. Marlstone, *Somerset*.
65. VERMETUS CONCINNUS. Inferior Oolite, *Yorkshire*.

## H. LIAS.

21 Lias..... { Argillaceous limestone, marl and clay, } Mollusca, reptiles, and fish of genera  
 — Lyme Regis, Dorsetshire, p. 273. .... } analogous to the Oolite.

## ROCKS.

1. LIAS MARL, containing remains of Saurian, *Mistelgau near Bayreuth*.
2. LIAS MARL, *Wurtemberg*.
3. LIAS.

## FOSSILS.

4. ACRODUS NOBILIS, Lias, *Lyme Regis*.
5. AMMONITE. Lias, Clay Ironstone.
6. AMMONITES BIFRONS. Lias, *Somerset*.
7. AMMONITES BIFRONS ? Lias, *Somerset*.
8. AMMONITES BIRCHII. Section of, Lias, *Lyme*.
9. AMMONITES COSTATUS. Lias, *Banz, Franconia*.
10. AMMONITES WALCOTTI. Lias, *Whitby, Yorkshire*.
11. (AMPHIDESMA) PANOPŒA DONACIFORME. PHILLIPS. Lias, *Lincolnshire*.
12. AVICULA LONGICOSTATA, STUTCHBURY. Loudon's Mag. Nat. Hist. New series vol. 3, p. 163.
13. BELEMNITES DIGITALIS. Lias marl, *Bayreuth*.
14. COPROLITES. Lias, *Lyme Regis*.
15. GRYPHŒA CYMBRIUM. *Goppingen, Wurtemberg*.
16. GRYPHŒA INCURVA. Lias near *Bath*.
17. HYBODUS BECHEI. Lias, *Lyme Regis*.
18. ICHTHYOSAURUS. Lias, *Lyme Regis*.
19. ICHTHYOSAURUS. Teeth of, Lias, *Lyme Regis*.
20. ICHTHYOSAURUS. Paddle of, Lias, *Lyme Regis*.
21. ICHTHYOSAURUS. Part of paddle of, BLUE Lias, *Lyme Regis*.

No.

22. *LIMA GIGANTEA*. Lias, *Cheltenham*.  
 23. *NUCULA OVUM*. Lias, *Lincoln*.  
 24. *OPHIURA KERTONI*. Lias, *Lyme Regis*.  
 25. *OPHIURA*. RAY OF, Lias, *Whitby*.  
 26. *PECTEN*. Lias, Middle Jura, *Khoraschorrs, Mozorr*.  
 27. *PECTEN EQUIVALVIS*. SOW : Lias, *Somerset*.  
 28. *SPIRIFER ROSTRATUS*. DEBUSH. Lias, *Puyserien*.  
 29. *TEREBRATULA FURCILLATA*. Lias, *Somerset*.  
 30. *TEREBRATULA NUMISMALIS*. Lias, *France*.  
 31. *TEREBRATULA TETRAHEDRA*. Lias, *Somerset*.

## I. TRIAS.

- |                                     |  |  |
|-------------------------------------|--|--|
| 22 Upper Trias....                  | { Keuper of Germany or variegated marls — Red, grey, green, blue and white marls and sandstone with gypsum — Württemberg, bone-bed of Axmouth Dorset, p. 289.....                  | { Batrachian reptiles, <i>e. g.</i> <i>Labrynthodon</i> , <i>Rhynchosaurus</i> , &c. Cephalopods: <i>Ceratites</i> . No <i>Belemnites</i> . Plants: <i>Ferns</i> , <i>Cycads</i> , <i>Conifers</i> . |
| 23 Middle Trias or Muschelkalk. . . | { Compact greyish limestone with beds of dolomite and gypsum.—North of Germany, p. 287 (Wanting in England..)  | { With <i>Equisetites</i> and <i>Calamites</i> .   |
| 24 Lower Trias....                  | { Variegated or Bunter sandstone of Germans — Red and white spotted sandstone with gypsum and rock salt, p. 288. Part of New Red sandstone of Cheshire with rock salt, p. 294..... | { Plants different for the most part from those of the Upper Trias.  |

## 22. UPPER TRIAS.

1. NEW RED SANDSTONE, *Sangerhausen*.
2. KEUPER SANDSTONE, *Stuttgart*.
3. *NOTHOSAURUS MIRABILIS*. (Trias).

## 23. MIDDLE TRIAS.

## ROCK

4. CRYSTALLINE MUSCHELKALK, *Budlocherberg* near *Bayreuth*.
5. LOWER MUSCHELKALK. *Wellen balk, Rehbach, Heidelberg*.

## FOSSILS.

6. *AVICULA SOCIALIS*, *Mytilus socialis*, Superior Muschelkalk, *Lamettarberg* near *Bayreuth*.
7. *BUCCINUM CORRUGATUM*, Muschelsand *Parma*.
8. *CYTHERIUM CINCTUM*, Muschelsand *Alzei*,
9. *CERATODUS GULIELMI*. (Trias), Muschelkalk.
10. *DRACOSAURUS BRONNII*. (Trias), Muschelkalk.
11. *ENCRINUS LILLIFORMIS*, Muschelkalk (rare) *Germany*.
12. *ENCRINUS LILLIFORMIS*, Muschelkalk, *Newstadt, Bavaria*.
13. *ICHTHYOSAURUS*, Fragments of bone of, Keuper, *Hohenham, Stuttgart*.
14. *LYCOPODIOLITES ARBORENS*. Keuper marl with, *Coburg*.
15. *LYNODON TRIGONOLITES (VULGARIS)*, Superior Muschelkalk, *Bayreuth*.
16. *MYACITIS BLONGATUS*. Superior Muschelkalk, *Bayreuth*.
17. *MYOPHORIA VULGARIS*. (Trias), Muschelkalk, *Germany*.

## AQUEOUS ROCKS.

## IV. PRIMARY.

## K. PERMIAN.

<i>Periods and Groups.</i>	<i>Examples.</i>	<i>Observations.</i>
25 Upper Permian..	{ Yellow magnesian limestone, Yorkshire and Durham p. 301..... Zechstein of Thuringia, Upper part of Permian beds, Russia.....	Organic remains, both animal and vegetable, more allied to primary than to secondary periods
20 Lower Permian..	{ a. Marl slate of Durham and Thuringia. b. Lower New Red sandstone of north of England and Rothliegendes of Germany. a. and b. Lower part of Permian beds, Russia, p. 301.....	

## 25. UPPER PERMIAN.

## ROCKS.

No.

1. BITUMINOUS MARL SLATE. *Eisleben.*
2. CAVERNOUS MAGNESIAN LIMESTONE. *Eisleben.*
3. EARTHY SWINSTONE. *Eisleben.*
4. ZECHSTEIN formation Limestone. *Gera, Thuringia.*

## FOSSILS.

5. FENESTELLA VIRGULIFERA. Permian, *Humbleton hill.*
6. PRODUCTUS ACULEATUS. Zechstein marl.

## 26. LOWER PERMIAN.

7. PECTEN PUSILLUS. Permian, *Durham.*
8. PALÆONISCUS FRIKSLEBKNI. Permian, *Thuringia.*

## L. CARBONIFEROUS.

<i>Periods and Groups.</i>	<i>Examples.</i>	<i>Observations.</i>
27 Coal measures..	{ a. Strata of sandstone and shale with beds of coal.—S. Wales and Nor- thumberland, p. 309..... b. Millstone grit.—S. Wales, Bristol coal- field, Yorkshire, p. 308. ....	Great thickness of strata of fluviomarine origin, with beds of coal of vegetable origin, based on soils retaining the roots of trees. Oldest of known reptiles of Archegosaurus, Sauroid fish.
28 Mountain limestone. ....	{ Carboniferous or mountain limestone, with marine shells and corals.... Mendip Hills, and many parts of Ire- land, p. 340.....	
27 Coal measures..	{ a. Strata of sandstone and shale, with beds, of coal.—S. Wales and Nor- thumberland; p. 309..... b. Millstone grit.—S. Wales, Bristol coal- field, Yorkshire, p. 308.....	Great thickness of strata of fluviomarine origin, with beds of coal of vegetable origin, based on soils retaining the roots of trees. Oldest of known reptiles of Archegosaurus, Sauroid fish.



No.

## ROCKS.

1. ANTHRACITE, *Shonfield*.
  2. COAL SANDSTONE, *Glasgow*.
  3. BROWN COAL SANDSTONE, *Rorschuch, Bodensee*.
  4. BITUMINOUS SHALE OR COAL, *Torbane hill, Scotland*. This substance was recently made the subject of trial in the *Scotch Courts*, as to whether it should be considered coal or not.
  5. CYCLOPTERIS FLABELLIFORMIS. Ironstone of Coal measures.
  6. MEGALICHTHYS HIBBERTI. Coal shale with jaw tooth of the, *Carlisle*.
  7. MEGALICHTHYS HIBBERTI. Scales of the, *Carlisle*.
  8. MEGALICHTHYS HIBBERTI. Coal shale with palatal tooth of the, *Carlisle*.
  9. MEGALICHTHYS HIBBERTI. Portion of the large scale of the, *Carlisle, Lanarkshire*.
  10. NEUROPTERIS LOSHII. Coal measures, Nodule of Ironstone, *Coalbrook Dale*.
  11. ORBICULA. Coal measures, near *Glasgow*.
  12. PECOPTERIS. Coal measures, *Spain*.
  13. PECOPTERIS. Coal measures, *Spain*.
  14. PECOPTERIS ASPEDIDOIDES. Coal measures, *Newcastle*.
  15. PECOPTERIS CISTII. Coal measures, *Newcastle*.
  16. PECOPTERIS CYATHEA. Coal measures.
  17. PECOPTERIS CYATHEA ? Coal measures.
  18. PECOPTERIS MILTONI AND NEUROPTERIS *spec.* Coal measures, *Newcastle*.
  19. PECOPTERIS MURICATA. Coal measures, *Durham*.
  20. PECOPTERIS PLUMOSA. Coal measures, *Newcastle*.
  21. PECOPTERIS POLYMORPHA. Coal measures, *Newcastle*.
  22. PECOPTERIS POLYMORPHA. Coal measures, *Newcastle*.
  23. PECOPTERIS SERLII. Coal measures, *Newcastle*.
  24. PENTREMITES FLOREALIS. Carboniferous, *America*.
  25. SIGILLARIA. Coal measures. T. A. K. 1839.
  26. SIGILLARIA.
  27. SPHENOPTERIS ELEGANS. Coal measures, *Waldenberg*.
  28. SPHENOPTERIS TRIFOLIATA. Coal measures, *Newcastle*.
  29. TRIGONOCARPUM NÖGGERATHII. Peel Quarry, Wortley. Coal measures, *Lancashire*.
-

- 28 Mountain Limestone..... { Carboniferous or mountain limestone, with marine shells and corals..... } Brachiopoda of genus *productus*.  
Mendip Hills, and many parts of Ire- } Cephalopoda of genera *Cyrtoceras*,  
land, p. 34e..... } Goniatite, *Orthoceras*.  
Crustaceans of the genus *Phillipsia*.  
Crinoidians abundant.

## ROCKS.

No.

30. MOUNTAIN LIMESTONE. *Glasgow*.  
31. MOUNTAIN LIMESTONE. *Ruppersdorf, Bohemia*.

## FOSSILS.

32. CYATHOCRINITIS RUGOSA. Mountain Limestone, *Carlisle*.  
33. COCHLIODUS. Mountain Limestone, *Bristol*.  
34. ENCRINITIS LIMESTONE.  
35. EUOMPHALUS PENTANGULATUS. Carb. Limestone, *Ireland*.  
36. NATICOPSIS PHILLIPSII. Carb. Limestone, *Cork, Ireland*.  
37. NUCULA. Mountain Limestone, *Carlisle*.  
38. ORTHIS RESUPINATA. Carb. Limestone, *Derbyshire*.  
39. PECTEN GRANOSUS? Carb. Limestone, *Ireland*.  
40. PRODUCTUS MARTINI. Mountain Limestone, *Carlisle*.  
41. SPIRIFER STRIATUS. Carb. Limestone.

## M. DEVONIAN.

- 29 Upper Devonian. { a. Yellow sandstone of Dura Den, Fife. } Tribe of fish with hard coverings like  
b. Red sandstone and marl with corn- } Chelonians, Pterichthys, Pamp-  
stone of Herefordshire and Forfarshire. } ractus, &c., also of genera *Cepha-*  
Paving and roofing-stone, Forfarshire. } laspis, *Holopsichius*, &c.  
Upper part of Devonian beds of south } No reptiles yet known.  
Devon..... }  
30 Lower Devonian. { Grey sandstone with Ichthyolite, —Caith- } Fish, partly of same genera, but of  
ness, Cromarty, and Orkney. Lower } distinct species from those in Up-  
part of Devonian beds of South Devon, } per Devonian; also *Osteolepis Coc-*  
and green chloritic slates of Cornwall, } costeus, *Glyptolepis*, *Dipterus*, &c.  
limestone of Gerolstein, Eifel. .... }  
..... }

## 29. UPPER DEVONIAN.

1. ASTRŒA. Species Devonian, *Torquay*.  
2. ASTRŒA HELIANTHOIDES. Devonian, *Boulogne*.  
3. BELLEROPHON. Devonian, *Spain*.  
4. CYATHOPHYLLUM CUESPITOSUM. Devonian system, *Bensberg* near  
*Cologne*.  
5. GONIATITIS INTUMESCENS. *Beyrich, Nassau*.  
6. PHACOPS LACINIATUS. Devonian, *France*.  
7. PTERICTHYS QUADRATUS. Devonian, *Scotland*.  
8. SPIRIFER. Devonian, *Spain*.  
9. SPIRIFER PELLICO. Devonian, *Spain*.  
10. SPIRIFER VERNEULLII, shewing interior. Devonian, *France*.  
11. TURRITELLA CORONATA. Devonian superior, *Paffrath*.  
12. TRIGINOTRELLA OSTIOLATA. Devonian superior, *Gerolstein*.

No.

## 30. LOWER DEVONIAN.

13. CALCEOLA SANDALINA. Devonian, *Eifel*.
14. CLYMENIA LEVIGATA. Devonian, *Eifel*.
15. COCCOSTEUS. Devonian, *Scotland*.
16. FENESTELLA ANTIQUA. Devonian, *Cornwall*.
17. HOMALONOTUS DELPHINOCEPHALUS. Devonian, *Eifel*.
18. MACROCHEILUS ARCULATUS. Devonian, *Eifel*.
19. MEGALODON CUCULLATUS. Devonian, *Eifel*.
20. ORTHIS. Devonian, *Eifel*.
21. OSTEOLEPIS. Devonian.
22. OSTEOLEPIS. Devonian, *Scotland*.
23. OSTEOLEPIS MAJOR. Devonian, *Scotland*.
24. PHACOPS MACROPTHALMUS. Devonian, *Eifel*.
25. SPIRIFER CANALIFERA. S. OSTIOLATA? Devonian, *Eifel*.
26. SPIRIFER VERNEULLI. Devonian.
27. —————? Devonian.
28. STRIGOCEPHALUS BURTINI. Devonian, *Eifel*.
29. TEREBRATULA ASPERA. Devonian, *Eifel*.
30. TEREBRATULA CONCENTRICA. Devonian, *Eifel*.
31. TEREBRATULA FERITA AND SPIRIFER HETEROCLYTUS. Devonian, *Eifel*.
32. TEREBRATULA RETICULARIS, VAR : aspera. Devonian, *Eifel*.

## N. SILURIAN.

- |                     |   |  |
|---------------------|---|--|
| 31 Upper Silurian.. | $\left\{ \begin{array}{l} a. \text{Tilestone of Brecon and Cærmarchen.} \\ b. \text{Limestone and shale, Ludlow, Shropshire.} \\ c. \text{Wenlock or Dudley limestone} \end{array} \right.$                         | $\left\{ \begin{array}{l} \text{Oldest of fossil fish yet discovered.} \\ \text{Trilobites and Graptolites abundant.} \\ \text{Brachiopoda very numerous.} \\ \text{Cephalopoda : Bellerophon, Orthoceras.} \end{array} \right.$   |
| 32 Lower Silurian.. | $\left\{ \begin{array}{l} a. \text{Caradoc sandstone, Cær Caradoc, Shropshire.} \\ b. \text{Llandeilo flags, calcareous flags and schists, — Builth, Radnorshire, Llandeilo, Cærmarchenshire.} \end{array} \right.$ | $\left\{ \begin{array}{l} \text{Same genera of invertebrate animals as in Upper Silurian, but species chiefly distinct Trinucleus : Caradoc, Cyatidæ, p. 358.} \\ \text{No land plants yet known.} \\ \text{Foot prints of tortoise, see note p.360.} \end{array} \right.$ |

- |                     |   |  |
|---------------------|---|--|
| 31 Upper Silurian.. | $\left\{ \begin{array}{l} a. \text{Tilestone of Brecon and Cærmarchen.} \\ b. \text{Limestone and shale, Ludlow, Shropshire.} \\ c. \text{Wenlock or Dudley limestone} \end{array} \right.$ | $\left\{ \begin{array}{l} \text{Oldest of fossil fish yet discovered.} \\ \text{Trilobites and Graptolites abundant.} \\ \text{Brachiopoda very numerous.} \\ \text{Cephalopoda : Bellerophon, Orthoceras.} \end{array} \right.$ |
|---------------------|---|--|

1. SILURIAN SANDSTONE. *Wessela near Beraun*.
2. ATRYPA GALKATA. *Hurst hill, near Dudley*.
3. ATRYPA TEREBRATULA. *Lineata. Tournay, Belgium. Devon*.
4. CALAMOPORA SPONGITIS. *Silurian Rock. Bensburg near Cologne*.
5. CELLIPORA, MADREPORA, RETIPORA, ENCRINITES.

No.

6. CALYMENE BLUMENBACHII. Head of, Silurian, *Dudley*.
7. CORALS from *Dudley*. LIMARIA CLATHRATA. Silurian.
8. CORALS. Upper Silurian, *Wenlock*.
9. CYSTIPHYLLUM SILURIENSE. Upper Silurian, *Dudley*.
10. EUOMPHALUS FUNATUS. *Dudley*, 1837. Dr. M.
11. EUOMPHALUS FUNATUS, t. 17-20.
12. GRAPTOLITES LEVIGATUS. Silurian, *Bohemia*.
13. GRYPHEA GLOBOSA (OSTREA). Baculite Limestone.
14. ORTHIS HYBRIDA. Silurian, *Dudley*.
15. PENTAMERUS KNIGHTII. Aymestrey Limestone, *Sedgeley*.
16. PHACOPS CAUDATUS. Aymestrey Limestone, *Sedgeley*.
17. PENTAMERUS KNIGHTII. Aymestrey Limestone, *Sedgeley*.
18. STROMATOPORA CONCENTRICA. Silurian, *Dudley*.
19. SPIRIFER BILOBA. Silurian, *Dudley*.
20. TEREBRATULA SUBLEPIDA. Silurian, *Dudley*.
21. TEREBRATULA RETICULARIS. Silurian, *Dudley*.

32 Lower Silurian..	}	a. Caradoc sandstone, Cær Caradoc, Shropshire.....	}	Same genera of invertebrate animals as in Upper Silurian, but species chiefly distinct Trinucleus caractaci, Cystidæ, p. 358. No land plants yet known. Foot prints of tortoise, see note, p. 360
		b. Llandeilo flags, calcareous flags and schists,—Builth, Radnorshire, Llandeilo, Cærmarthenshire.....		

22. AGNOSTUS PISIFORMIS. Silurian, *Sweden*.
  23. ASAPHUS EXPANSUS. Silurian, *Russia*.
  24. ASAPHUS RANICEPS. Silurian, *Russia*.
  25. ATRYPA GALKATA. *Hurst hill*, near *Dudley*.
  26. GRAPTOLITHUS. Lower Silurian, *Scotland*, *Hurtfell*, *Dumfriesshire*.
  27. OGYGIA BUCHII. Lower Silurian, *Cambrian of Sedgwick*.
  28. ORTHIS BIFORATUS. Silurian, *America*.
-



32

TO BE HAD AT THE MUSEUM.

REPORTS FROM THE GOVERNMENT CENTRAL MUSEUM,

giving an account of its origin and objects.

Price—*One Rupee.*

---

REPORT FROM THE GOVERNMENT CENTRAL MUSEUM,

giving a description of the Mammals of Southern India.

Price—*One Rupee.*

---

REPORTS FROM THE GOVERNMENT CENTRAL MUSEUM,

giving an account of the Iron Ores of Southern India.

Price—*Three Rupees.*

---

CATALOGUE OF THE GOVERNMENT CENTRAL MUSEUM,

containing Catalogue of the Aqueous Rocks as Mineral Structures; Catalogue of the Aqueous Rocks and Fossils in the order of their Superposition; Geology of Madras, its Rocks and Minerals; and Geology of Tinnevely—Price—*One Rupee, Eight Annas.*

---

CATALOGUE OF THE BRITISH SHELLS IN THE MUSEUM.

Price—*One Rupee.*

---

CATALOGUE OF THE FOSSILS IN THE MUSEUM—PART II.

Price—*One Rupee, Eight Annas.*

---

CATALOGUE OF THE MINERALS IN THE MUSEUM

to illustrate the Physical and Chemical characters of Minerals.

Price—*One Rupee, Eight Annas.*

